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THE IRON AGE

JULY 21, 1938

ESTABLISHED 1855

Vol. 142, No. 3

The Saga of Johnny Bernal

JOHNNY BERNAL is not a viking. Yet he has a saga such as a viking might envy. Vikings, by repute, were big men physically. Johnny is a big man too, although he stands about four feet six.

Until last week, I had not seen Johnny for 25 years. The last time I saw him then he was standing on a soap box so that he could be tall enough to reach a polishing wheel at which he worked for the Buffalo Forge Co.

Johnny was then 60 years old, or young, whichever way you want to put it. Quite a way beyond the 40 year "dead line" that some people like to talk about. And he had been working for the same company for 31 years.

That was 25 years ago, when I left the superintendency of that company to enter the field of journalism.

A lot of water has gone under the bridge and over the dam in the meantime. We've had a World War, and three depressions during that quarter century. And people's ideas have changed during that time too. Effort isn't so fashionable as it was once, and people have come to believe that the world owes them a living.

Last week, at an annual picnic of Buffalo Forge and associated companies, the first one I have been able to attend for a quarter century, I met Johnny again. Eighty-four years old now and still working for the same company. But in the inspection department.

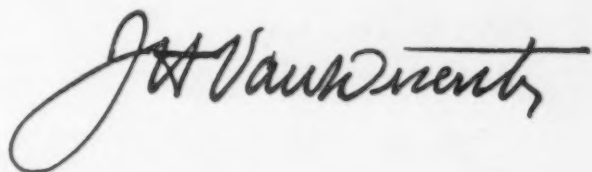
Fifty-six years with one company. That's what you might say was a pretty "steady" job.

Johnny could have retired on a pension years ago if he had wanted to. But he has old-fashioned ideas. He likes work.

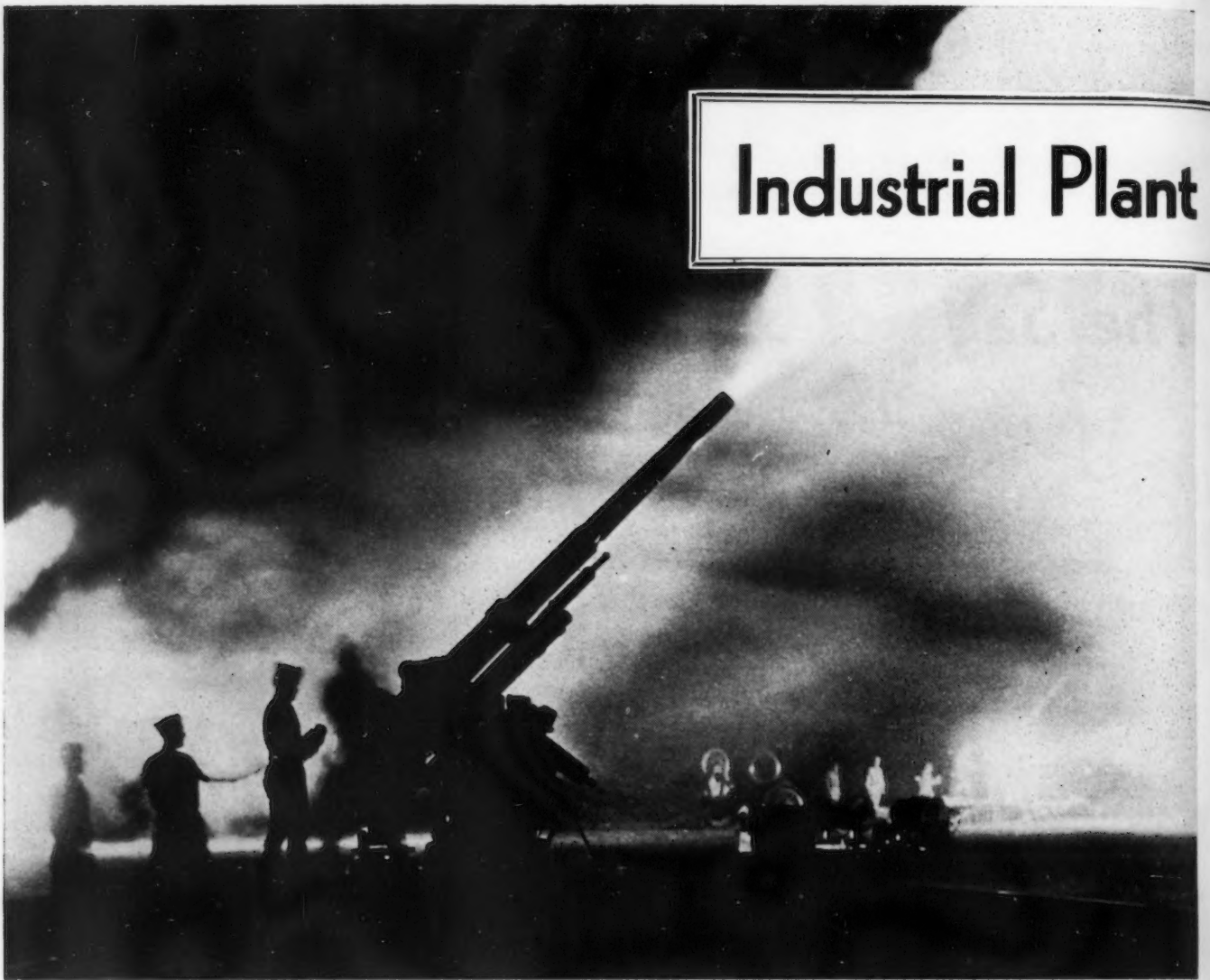
During his 56 years of effort, Johnny has helped to make lots of things for many thousands of people to use, to profit by and to enjoy. People all over the world owe something to Johnny. What a grand thing it would be if we had some sort of television so that Johnny could see and know the useful results of 56 years of honest and capable effort!

I'll say that Johnny has a saga. No viking ever did so much good for as many people.

And what about the social usefulness of a company that has been able to provide Johnny and others with steady jobs for more than half a century? That is something of a saga too!



Industrial Plant



OUR next war will be a war of metals. It will be a battle between the metal working industries of the world.

Success in the next conflict will crown the efforts of the nation with the best industrial mobilization of its metal working trades. The last two decades have changed the entire complexion of modern armies with the emphasis not upon man power, but upon machines and mechanization. The tonnage of metal used in combat units has vastly increased over World War conditions so that the load on industry will be immensely greater than in 1918.

Metals Versus Man Power

Let us look at a practical example of this. The First Cavalry (Mech-

*These figures are substantially correct. The exact figures are in process of change.

By COL. H. A. TOULMIN, Jr., D.S.M.

• • •

anized) of the United States Army, with a strength of approximately 800 men, has the capacity to deliver small arm fire upon the enemy equal to that of a World War Division of 22,000 men.* In place of 22,000 soldiers, we have the mass effect of two and one-half million dollars worth of scout cars, armored cars and combat cars. Metal tonnage has taken the place of men. We have motorized machine gun carriers and rolling repair vehicles for repairing automotive equipment and ordnance. We have great masses of machine guns. We have motorized artillery instead of pulling it by horses.

We have substituted brain for brawn and metal for man power. And all through the Army, we now have,

as in foreign armies, the mechanized, robot division. Our new division will have approximately 13,000 men, contrasted with a World War division of 22,000 men, with a greater proportion of guns, trucks, tanks and armored cars to make up for less man power.

The old infantry regiment had 3106 men and officers and 21 tons of transport; now it has 2472 men and from 600 to 800 tons of transport. It has increased its machine guns from 36 to 140 and its automatic rifles give it a fire power equal to 7300 men with the Springfield rifle—and it takes this metal tonnage to move the ammunition for such amazing fire. The old cavalry regiment boasted 35 tons of transport and 1441 men with 16 machine guns; the new mechanized regiment has 817 men, 521 machine guns and over a thousand tons of transport and mechanization.

Mobilization for The Next War--I

In the old days a division did well to cover 15 miles in a day; now it does 50 to 60. The new units deliver in tons of metal in a given period 22 per cent more metal with 40 per cent less men. Now we have 9.5 pieces for 1000 men as compared with 7 in the old outfits.

Everywhere you look in a modern army, you notice tanks, trucks, motors and powerful weapons machine-carried or pulled. The individual, as a soldier, has become completely secondary; indeed, you have to look to find him in a modern army. The whole tempo of war is accentuated by its motorization.

In the World War, our 75 mm. gun had an effective range of 7500 yd.;

ADEQUATE preparation is the best preventative of war. An adequate preparation today means the most efficient possible mobilization of industry and particularly of the metal working industry.

For the next war will be a war of metals.

This is conclusively demonstrated in the accompanying article by Col. H. A. Toulmin, Jr. It discloses the amazing trends and progress of military mechanical modernization since the World War.

Should America be called upon to play a part in another major conflict, it will be found to be far better prepared for it than it was two decades ago, and primarily because of the effective organization of our industries, plus the remarkable development in ordnance design and in production methods.

(Photos by courtesy of the U. S. Army Signal Corps.)

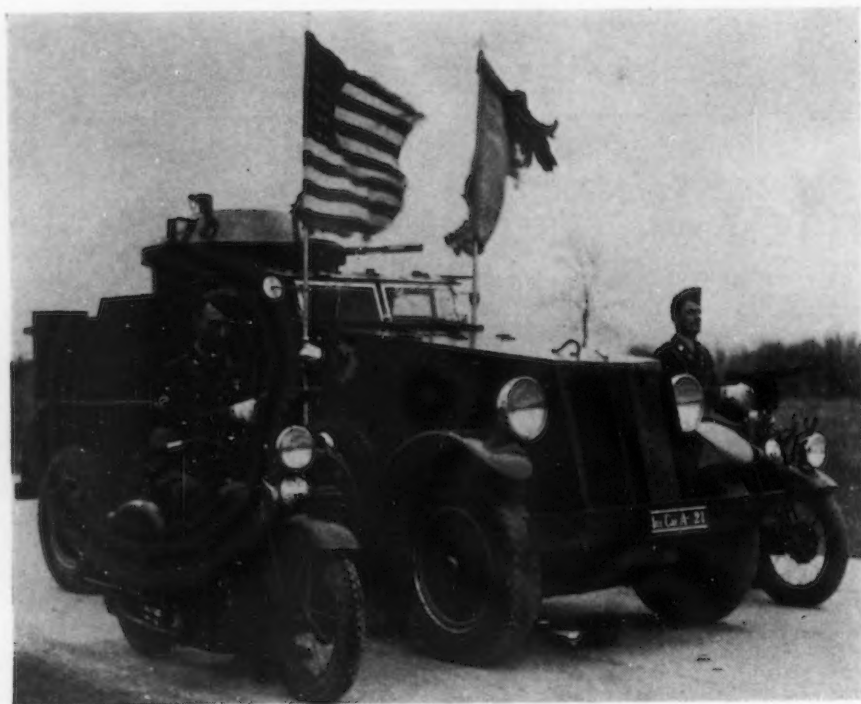
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now it is 15,000 yd. In the World War, our 155 mm. Howitzer had a range of 12,000 yd. and now it has an effective range of 26,000 yd. All this

means a new class of metals and metal working. Our anti-aircraft guns are automatically aimed by mechanical calculators, which gage the speed and



San Antonio Division Tests, held at San Antonio, Tex., fall of 1937. Tanks of 2d Tank Company operating with opposition force.



Combat car of 1st Cavalry, mechanized, at Fort Knox, Ky.

altitude of the airplane target, determine the fuse setting and control the fire of the 3-in. shells at 100 a min. Both guns and searchlights are synchronized.

Thus we have reduced man power and enormously increased the tonnage of metals per man. Industry generally with its own domestic problems has failed to realize this sweeping revolution in the art of the successful prosecution of a modern war. But it is an able industry that spells success in a mechanized conflict.

Modern armies subsist on industry and only because of industry. Industrial mobilization of the metal trades is the very essence of successful war. What is more important, it is the key itself to not having a war. The nation that has an effective mobilization of its metal trades is the nation that probably will never have the occasion to use its manufacturing facilities and its armies.

Mobilization Organization

The War Department, under the direction of Col. Louis Johnson, the Assistant Secretary of War, has developed a vast organized plan of industrial mobilization in preparation for making war. The Army wisely realizes that the whole success of its program depends upon what industry does about it because we now have a "machine force." We now make our

fighting soldiers in the foundry and machine shop: not on the duel field. It will be too late in the next war to

organize a General Munitions Board and a War Industries Board in the leisurely fashion such as we did during the last World War.

So Colonel Johnson and his associates have provided machinery for gearing industry to the Army and making this "war of metals" effective before the first shot has ever been fired. To do this, the Assistant Secretary of War is charged by law, under the National Defense Act, with organizing the plants of the nation into munition producers, with the minimum interruption to the civil life of the nation. His office is provided with an Allocation Branch and a Planning Branch to organize industry; and an Industrial War College for the training of Army leaders in the art of the mass production of munitions and the control of industry for the manufacture of ammunition, artillery, tanks and all the metal gadgets of war. Instead of waiting until we become involved in a conflict to create our organization, there has already been created a frame-work for the management of our vast industries for the production of munitions.

Machine Gun Squad. Doughboy Machine Gunners of the District of Washington's Battalion of the 12th Infantry, putting the machine through a little voice culture. Oct 31, 1937.



There is a War Resources Administration, with a Legal Division, a Policy Division, an Administration Division, a Liaison Division, a Facilities Division, a Transportation Division, and a Power and Fuel Division. There is a War Trade Administration; a Price Control Committee; a Selected Service Draft Administration; a War Finance Control Commission and a War Labor Administration.

Allocation of Production

At the beginning of the last war, one of our principal difficulties was the competition between the Army and Navy for production from our plants. This is all changed now, under the National Defense Act, as the Army and Navy, in advance of war, decide upon a division of each plant, or plants, between themselves. The Navy takes one plant and the Army another, or they share in some predetermined agreed ratio the productive facilities of a particular plant.

After this general allocation of plants has been made, the Assistant Secretary of War, in effect, says this to each potential munitions maker: "We would like to survey your plant to see what you can produce that comes within our munitions schedule of what we want. Let us sit down together and see what your plant can do. We will then allocate your plant a schedule of production of how much you can make, what you will make and what you will need to make it. We will sign a memorandum expressing our understanding so we will know we can rely upon you in time of war. So as to prevent upsetting business generally, we are only going to take twenty to fifty per cent of your capacity when war comes."

Working along this reasonable line, Army officers have surveyed more than 10,000 firms. They have studied the facilities of these firms. Each Corps of the War Department, whether it be the Quartermaster, Ordnance, Air Corps or Signal Corps, has had its experts look over each plant and they have determined between themselves what particular branch of the Army can have its needs filled by that particular plant. The War Department representatives and the representatives of the firm have worked out tentatively what can be done by that particular firm.

When war comes, the firm thus sur-



First Army Maneuvers, Pine Camp, N. Y. August, 1935. Christie Tanks, "F" Company, 67th Infantry, at 1st Division Maneuvers.

veyed, having its allocated schedule of production, will know exactly what it is going to be called upon to do. It will already have studied out its plans to carry the industrial burden of making war. As it is on the list, its needs for priority in materials will have been calculated and provided for.

A WORD ABOUT THE AUTHOR

HARRY AUBREY TOULMIN, JR., is an outstanding authority on the status of our national defense. During the World War he was successively assistant secretary of the General Munitions Corps of the Council of National Defense; captain of the U.S.R. Ordnance; major of ordnance, acting chief aerial armament division of the A.E.F. in France; lieutenant colonel of the Air Service and assistant chief of the staff of the Air Service of the A.E.F. in France and chief of the coordination staff. Keeping his interest in military affairs since the World War, he is now Colonel of the Engineers of the United States Reserve Forces, deputy chief of the staff of the Ohio Military Area, U. S. A. and colonel commanding the 329th Infantry of the 83d Division. His civilian career embraces a distinguished record as a patent attorney and author.

"Experience Plants"

More than that, it will probably have had what the British call a "shadow plant" set up in the factory. This means that in many factories there is going to be set up a complete small plant equipment for producing the particular munitions that that plant is going to turn out in time of war. This is a sort of "experience plant" to let the management find out what are the problems to be solved on a small scale before they are called upon suddenly to make the same munitions on a large scale. This so-called "pilot plant" represents one of the fundamental ideas of the Assistant Secretary of War, Colonel Johnson, to make us ready overnight.

These allocation schedules not only eliminate duplications and competition between branches of the service, but they very carefully list the location, financial rating, business affiliations, the number of skilled and unskilled workers. Also such a study comprehends what new construction will be needed to remove bottlenecks in production, what electric loads, what increased power facilities will be needed, what housing for the increasing number of employees and all the other factors that must be considered in stepping up munitions production for a civilian plant.

(TO BE CONTINUED)

Getting the Most Out of Cold

IN cold heading steel wire, it is not uncommon for the tool pressures to be in excess of the capacity of any tool steel to withstand. In other words, a great deal of this work is actually being done beyond the strength capacity of the tool steel. This is made possible by preloading the tool in the direction opposite to the stresses of service. For example, a solid cold header die is subjected to an enormous bursting action. Either jackets can be shrunk around the impression to preload the hole, or the same thing can be accomplished with properly designed quenching fixtures. It is not at all difficult to set up a compressional stress of 150,000 lb. per sq. in. on the hole of a solid header die by means of a flush quench. This means that the first 150,000 lb. of bursting stress in service "doesn't count" and the full strength of the steel is available beyond this point.

The manner in which the tool designer tackles the above problem will have an important bearing on the type of tool steel he must use. In general, he can do one of three things:

I. He can ignore preloading altogether both in design and heat treatment. If so, his heading machines will be limited to the less difficult types of work. Tools so made are very likely to be tempered (or drawn) after hardening to a rather low hardness value. Quite frequently the tools are drawn soft enough to ream the hole and may show anywhere from C-50 to C-59 Rockwell. Both the wear resistance and the strength of the tool are limited, and this limits the type of work that can be undertaken, and the production to be secured from each tool.

II. He can make up composite tools by shrinking or pressing an outer jacket over a hardened core. Many types of carbon and alloy tool steel have been used (with varying degrees of success) by this method. Even high speed steel or high-carbon, high-chrome steel cores have been tested and occasionally used. This method can of course be used only for solid

header dies and has no application in gripper dies.

III. He can build up favorable internal strains by hardening the tools in a suitable quenching fixture. Since strains of useful magnitude can be built up only in a water-hardening tool steel, there is virtually only one type of tool steel in general use in such plants. This must be a substantially plain carbon tool steel, usually containing from 0.80 to 1.10 per cent carbon. This type of steel hardens

THE first three articles in the series appraising modern cold heading practice by Frank J. Oliver, associate editor, *The Iron Age*, covered the fundamentals and laid the groundwork for a better understanding of this detailed study by Mr. Palmer of factors affecting die life. He describes methods of preloading dies to increase their useful life and discusses the various types of die failure and how they may be overcome by proper heat treatment. The intangible factor of timbre of tool steels is also analyzed. The earlier articles appeared in the issues of June 9 and 23 and July 7.

only on the surface and is supported underneath by a tough core. Any alloy in the steel which would cause it to harden more than say $\frac{1}{4}$ in. deep, ruins the steel for this type of work. Carbon steels containing about 0.20 per cent vanadium are eligible, but are not nearly as popular as the plain carbon types. This procedure, and these steels, are applicable to solid dies, gripper dies, and header punches.

Without having any accurate figures to go by, it is probably a fair

guess that at least 80 per cent of all cold header tools fall into Class III and use substantially straight carbon tool steel. Further comment will therefore be confined to this procedure.

Types of Die Failure

That all cold heading tools ultimately fail in service is obvious. The reasons for discarding them may be grouped under four definite heads.

1. The loads of service are too great for the strength of the tool and it splits outright. Fig. 1 illustrates a failure of this type.

2. Under repeated hammering, the hard surface caves in and ultimately the tool will spall somewhere in the impression. Fig. 2 shows a gripper die failed in this manner.

3. Small pieces will chip out. This usually happens on a corner or shoulder as illustrated in Fig. 3. The chips are much smaller than the pieces which spall out in failure No. 2, and chipping is likely to occur early in the history of the die, whereas spalling usually occurs after a considerable amount of service. Sinking and spalling can frequently be identified by carefully measuring the parts just before failure and finding enlarged sections on the work where the tool has started to sink. Chipping, on the other hand, usually proceeds from a tool that is fully up to size and shape.

4. The tools may wear oversize. This is the way all tools should ultimately fail, but this desirable end can be achieved only when none of the first three types of failure occur.

The causes and cures for these failures will now be discussed. It has already been mentioned that plain carbon (or carbon-vanadium) header die steels harden only on the surface. This hard shell, showing perhaps C-66 Rockwell as quenched, may penetrate $\frac{1}{8}$ in. or less. Below this there is a tough core having a Rockwell hardness of about C-40 to C-48.

The penetration of hardness in any given tool can be controlled, within limits, by the hardening temperature.

Heading Dies

By F. R. PALMER

Assistant to the President, Carpenter Steel Co.

A good header die steel can be hardened anywhere between 1450 and 1600 deg. F. The higher the hardening temperature, the deeper the penetration of hardness, and also, the higher will be the hardness of the tough core. The progress of this procedure can readily be followed in Fig. 4.

Assuming that the tools have been properly flush-quenched to produce optimum internal strains:

(a) Tools will split when the hardness penetration is too deep. The remedy is to lower the hardening temperature until splitting stops.

(b) The tool will sink and then spall when the hardness penetration is too shallow. The remedy is to raise the hardening temperature until spalling is eliminated. Fig. 5 shows a sectioned and etched die that has just started to crack as a result of sinking at the shoulder. Note the relatively shallow hardness penetration compared to Figs. 1 and 3. Otherwise, this die presents a beautiful hardening pattern.

(c) Tools will chip if they have been improperly or insufficiently tem-

pered (or drawn) after hardening. Chipping is usually an evidence of a brittle (or perhaps an overheated) structure in the steel, and is corrected by improved hardening, or by a longer soak at the drawing temperature.

(d) If the tools do not fail by any of the above three processes, they will wear out. Some people take the short and easy route to this desirable end by using the practice first mentioned in method No. 1. However, their dies are soft, and they wear oversize rapidly. It is quite evident that, other things being equal, a harder die will outwear a softer die. The trick to getting maximum hardness (without incurring failures of types 1, 2 or 3) is so to perfect the flushing equipment that maximum favorable internal strains are developed. Obviously, this

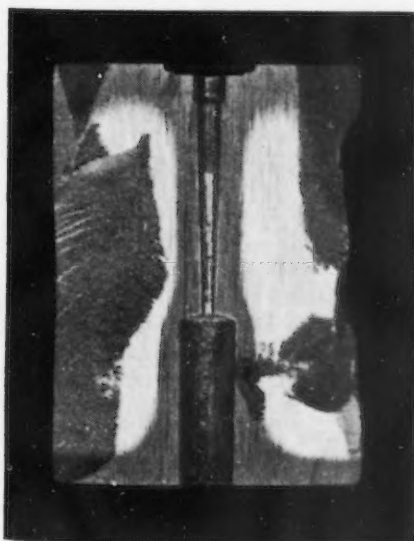


FIG. 1—This solid header die split in service due to excessive depth of hardness. Section smoothed and etched to show hardness penetration. Dark areas are hard, light colored areas are soft.



FIG. 2—A gripper die that spalled in service.

reduces the requirements for strength and toughness in the steel itself and permits the use of harder wearing surfaces without failure. The best practice will leave the working surfaces of the header die about C-61 to C-63 Rockwell hardness.

It will readily be appreciated that the above program throws quite a weight of responsibility on the manufacturer of tool steel for cold header dies. In the first place, his steel must be very clean, sound, and free from all internal defects that would become starting points for failure under ex-

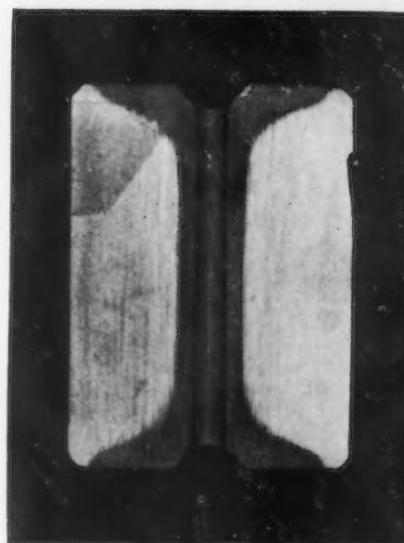


FIG. 3—This solid screw header die failed by chipping although it showed an ideal hardening pattern after it had been sectioned and etched.

cessive operating loads. This protection is best assured by using the hot acid disk inspection. All cold header die steel should be subjected to the hot acid test by the steel manufacturer or the customer, or both. Complete instructions for making the hot acid etch test are given in the National Metals Handbook, or in Technical Bulletin B of the Carpenter Steel Co.

Timbre of Tool Steels

Since the life of a header die depends to such a large extent upon the exact penetration of hardness, it is quite important that each and every bar be alike in this particular. It is now quite generally recognized that two bars of steel may have the same chemical analysis, they may be equally sound and free from internal defects, and yet they may have a different inherent penetration of hardness. The steel may harden quite shallow, it may harden quite deep, or it may harden anywhere in between, as shown in Fig. 6. This variation in response

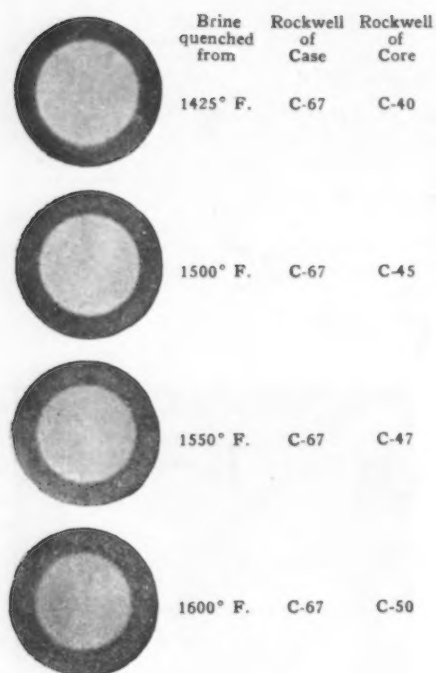


FIG. 4—Shallow hardening carbon tool steel—samples $\frac{3}{4}$ in. round—showing effect of hardening temperature on penetration, and core hardness.

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to heat treatment is ascribed to a property in the tool steel variously referred to as timbre, personality or P-F characteristics.

Anyone who has ever done much work on cold header dies is familiar with the following situation. A bar of a certain brand of tool steel will be procured and perhaps made up into 30 header dies. After a certain amount of experimental heat treating, a procedure will finally be arrived at that gives reasonably satisfactory results. By this time, the bar has been used up and a new bar has been procured—presumably, exactly the same steel. However, when dies are made up from the new bar and heat treated like those made from the first, they give practically no production and the heat treating problem must be worked out all over again. This is due to variations in the timbre of the steel from one shipment to another, and it makes for nothing but trouble in a cold heading plant.

Timbre is a heat characteristic—that is, the timbre is uniform throughout any given melt of steel. This property can be controlled by the steel maker and he can deliberately melt batches that will harden to the depth that he wants. In manufacturing header die steel, a certain timbre steel must be adopted by the manufacturer,

and he must then stick rigidly to this same specification so that his bars of header die steel will be “interchangeable” in the hands of the customer. This is a very recent development in the manufacture of tool steel and it has made possible tremendous strides in the manufacture of cold heading tools. Instructions for timbre testing are given in the National Metals Handbook, or can be found in Technical Bulletin C of the Carpenter Steel Co.

In conclusion, a word should be said about trying out a new grade of header die steel. It is not uncommon for a buyer to say to a tool steel salesman: “All right, send me a piece of your header die steel about 6 in. long, and I will make up a couple of dies and try them.” Generally speaking, this is a waste of time for both parties. It would be the merest luck if the proper heat treating were applied to these first two tools. There is not enough material available to work out the proper heat treatment for that particular kind of tool steel, and no satisfactory results can be expected unless this is done.

It is the writer's opinion that a buyer of header steels should first satisfy himself as to the ability of a new vendor to supply steel that is clean and sound, and steel that is interchangeable in its hardening characteristics.

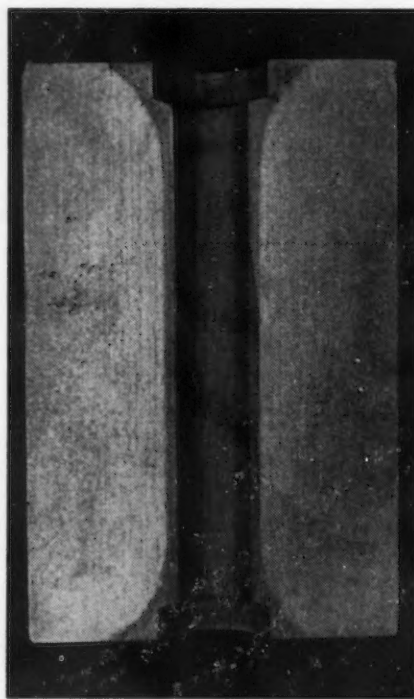


FIG. 5—Too shallow hardness penetration caused sinking and cracking at the shoulder of this solid header die, shown sectioned and etched.

Shallow
hardening
timbre

Medium
hardening
timbre

Deep
hardening
timbre

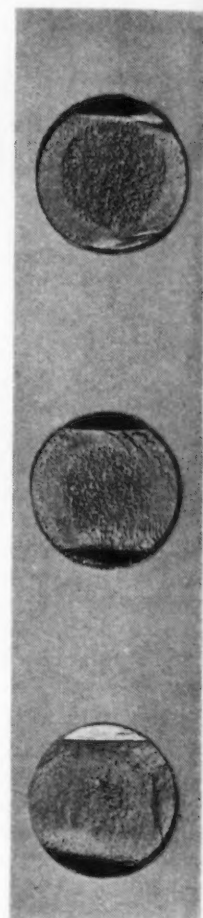


FIG. 6—Round samples from three different lots of carbon tool steel, hardened at 1550 deg. F. Analysis is the same, but the hardness penetration is different, because the timbre is different.

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acteristics from one lot to another. He should then procure enough steel to enable him to intelligently work out the heat treatment that will give maximum production for a certain tool and a certain job. This heat treatment will be different for different cold heading operations, so he must stick to one job and one tool steel until he feels that its possibilities have been exhausted. A steel mill that has manufactured much header die steel is equipped to conduct a “post-mortem” on a tool after it has failed and assist its customer in applying the proper correctives.

No type of tooling is a greater tax on the ability of the consumer, the ability of the tool steel manufacturer, and the resourcefulness of both, than are cold heading tools. The writer has seen production on a given header die gradually jacked up 1000 per cent by the patient and consistent application of the principles set forth above.

Die Castings Gain Ground in Hardware Production—I

By HERBERT CHASE

FOR advanced practice in hardware manufacture, especially in the production of locks of numerous types, it is doubtful if the procedure of the Yale & Towne Mfg. Co. can be matched. Although the company's antecedents date back more than a hundred years, production facilities are kept right up to the minute. They include foundries for sand casting in all the common metals, departments devoted to stamping and to screw-machine operations, well equipped machine shops, a forge shop, several tool rooms and lastly, one of the largest and best equipped die casting departments in the East, and one in which the intricacies of the dies employed can scarcely be equaled. In addition there are departments devoted to finishing, including electro-plating and the application of many organic finishes.

In a plant possessed of facilities so varied and so well organized, it is significant that the departments concerned with the initial production of die castings and with subsequent operations on these have grown so rapidly. They account for an important and ever increasing proportion of the company's output. This trend has not been because of any predilection favoring die castings, since other methods of production had been profitably and efficiently established long before die casting was considered. It is a result, rather, of a keen perception of the

part die castings are destined to play in the hardware field and a resolve to meet the type of competition in which they are becoming of increasing importance. To this end, the die casting department was established some five years ago and is daily demonstrating its ability to turn out precision castings at low cost.

Today, this department makes use of 15 die casting machines, of which all but three are of a type designed and produced by the company for its own use. All of these are operated exclusively on high-purity zinc alloys of the Zamak type, the No. 3 grade being used exclusively at present. Low cost, ease of casting and excellent physical properties for the specific applications are the primary reasons for using the zinc alloys only in die casting work. In finished products, the die castings are combined, of course, with parts of many other metals worked in other departments.

Intricate Coring Required

No small measure of the success attained with die castings is attributable to well designed and extremely well built dies, some of these being of extraordinary complexity because of the intricate coring required in many of the small lock parts produced. In general, the dies have several cavities and often they are fitted with several strictly interchangeable parts such as are needed for rights and lefts, for

numerous key changes and for special requirements of different customers and different designs of lock. Cores are all made for automatic operation and many of them require a dozen or more small parts which sometimes are required to interlock. Moreover, dimensional limits of plus or minus 0.001 in. have to be held in the castings and some of these dimensions, being determined by parts of the die having motions relative to each other, require an exceptionally fine job of fitting die parts, as well as provision for adjustment of certain parts. Despite high initial cost and much upkeep work, the need of only a minimum of machine work makes such dies a good investment.

Few details in regard to dies can be given, but some idea of the problems involved can be had by reference to the accompanying illustrations of certain dies. Sections as thin as 0.015 in. are cast between movable cores in some instances. Wherever feasible, several parts of the same assembly are produced in the same die, which sometimes yields as many as a score of small castings in a single "shot" of the casting machine. This is one of many items contributing to economy in production as well as to moderate die cost. All dies are hardened, as this is essential to maintaining the degree of accuracy needed when parts have relative motion. The closest possible coordination is maintained, of

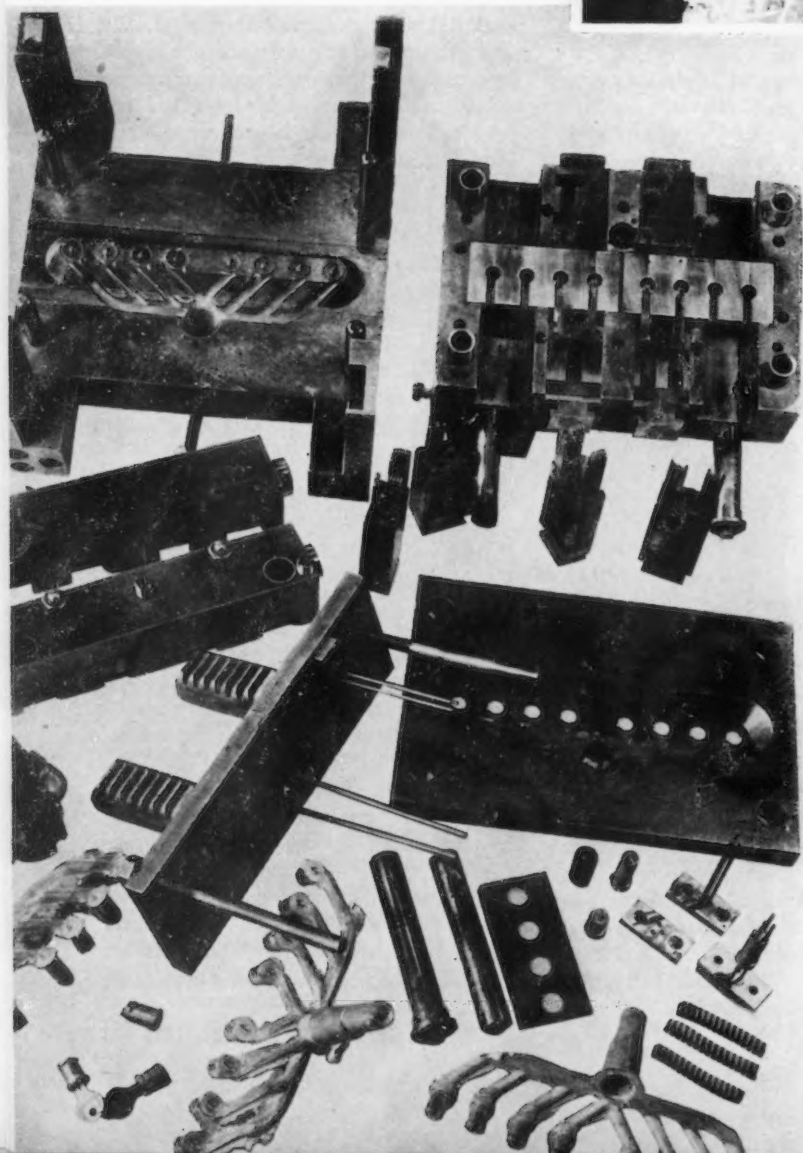
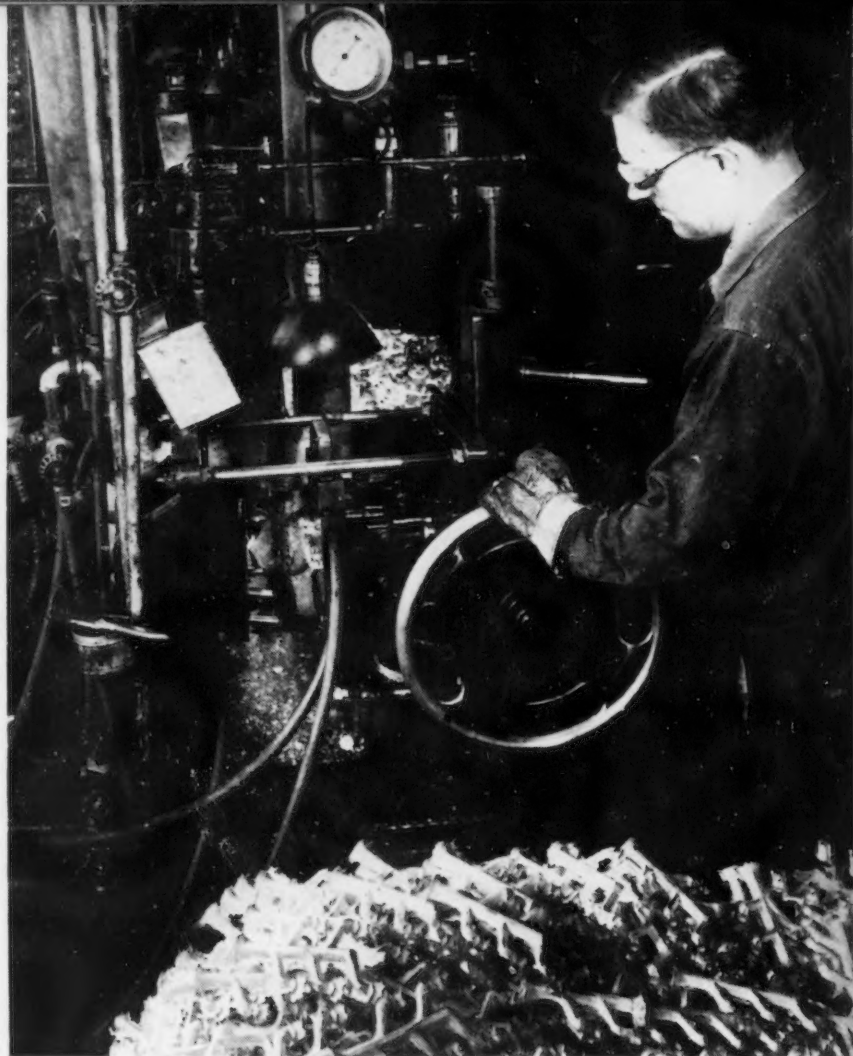
THE Kipcaster, which is used for dies 6 in. square, is shown forming the gates of five small castings shown in the foreground. Dies are opened and closed with the handwheel, but are locked by an air piston. About 400 to 450 shots an hour are made with this machine.

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course, between the die shop and the casting shop, as well as between the designers of the parts to be produced and of the dies to make them.

Machine Characteristics

In the Yale & Towne die casting machines, dies are opened and closed by a vertical air-operated piston actuating a toggle mechanism. The rear die head slides on two tie bars, one above and one below the axis of the machine. Toggle pressure is transmitted by links which bear near the four corners of the head. Metal in-



DIE for producing eight plugs (seen on gate in foreground) dismantled to show the complexities of the core and other parts required. Core parts are made interchangeable and are arranged for automatic operation. Slides shown just below the main die body in the right background carry as many as a dozen cores for making the transverse holes in the plugs, some of which are spaced only 0.015 in. apart.

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jection is by an air-operated plunger exerting an average of about 1200 lb. per sq. in. on the molten metal. The latter is maintained, by automatic controls, at the temperature found to give the best castings from the particular die in use, generally about 780 deg. F.

Molten metal is ladled into the metal pot from a supply wagon in which it is brought from an adjacent melting room. Although the machine can be operated at 400 or more cycles an hour, an average of about 300 is maintained as a rule to give time for proper operation of cores, for hand ejection and for such inspection of the gate of castings as conditions require to maintain a uniform product. The latter is gaged at least once an hour to make sure that proper dimensions are maintained. Every effort is made to produce castings of maximum density and smooth surface finish so as to avoid rejects and to minimize polishing and buffing costs.

Safety Paramount

Especially noteworthy are the precautions taken for safety and comfort of casting machine operators. An in-



OPERATOR breaking castings from a gate of eight as the sprue is held in a tube nearly hidden in this view. As the castings are broken off, they drop into the chutes and are thus sorted into tote boxes.

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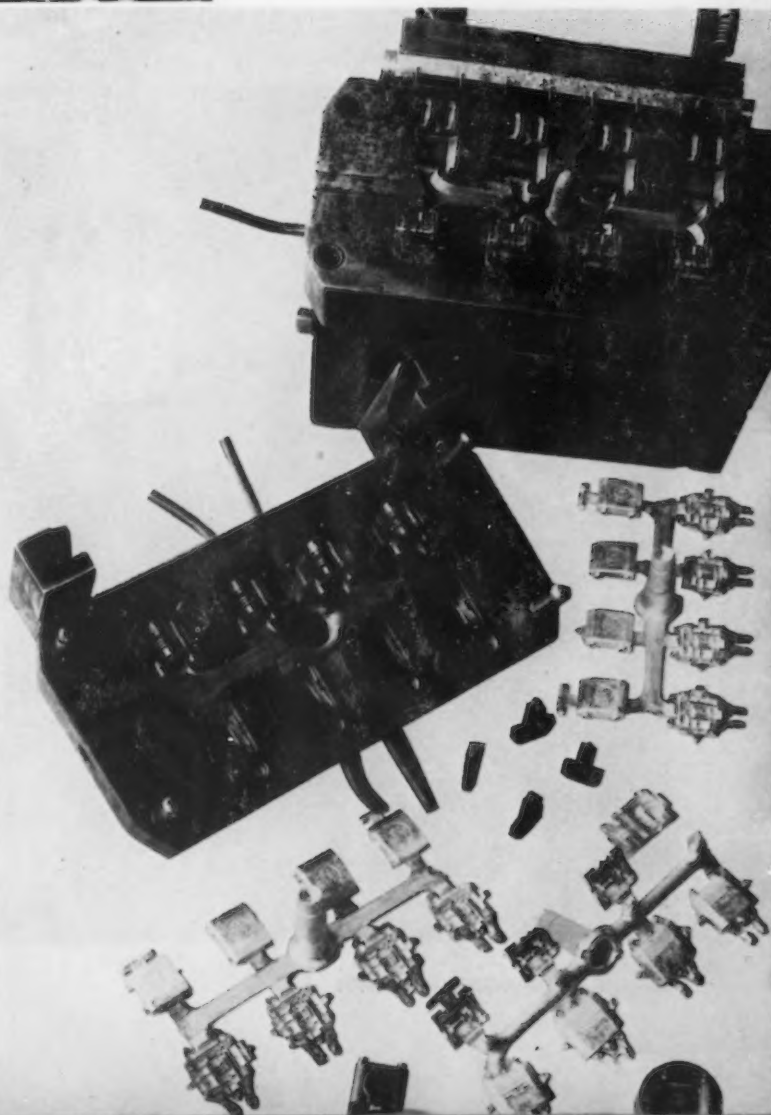
Kipcasters are of the same size and, being small, are easily handled and quickly changed.

Operators use tongs to remove gates of castings from the dies and then lay the gates in tote boxes, using care to avoid marring the castings. As the castings are all small and nearly all of thin section, they cool rapidly. Tote boxes are wheeled to adjacent positions in the casting room where about a dozen power presses are set up for trimming from gates and for rough cleaning of flash from castings. Many castings are broken from gates by hand, however, especially where flash

terlock is arranged on the toggle mechanism in such a way that the metal plunger cannot be operated until the dies are not only closed but securely locked. Sheet metal guards are placed around the die parting close to the die and metal screens are hung between machines. An extra guard arranged to swing into place as the dies close is a further safeguard against any chance of metal reaching the operator's face should "spitting" occur. All furnaces are insulated and have closed hoods connected to an exhaust system which draws off fumes and helps to keep the room cool. This applies also to the Schultz machine, one of which is used, and to the two Kipcasters which are employed for making some castings suited to production in 6 x 6-in. dies. Dies on the Schultz machine are hydraulically operated from a built-in Oilgear unit, and the Kipcasters, which run about 400 to 450 shots an hour, are air operated as to opening, closing and locking dies, a hand wheel being used to actuate ejector pins. The Schultz machine takes the same dies used on the Yale & Towne machines and operates at about the same speed. All the dies for the

DIE for casting the two halves of four padlocks simultaneously. The gates of eight castings are shown and also, in the foreground, one of the hobs for forming parts of the cavities and a removable plug such as is hobbled and later inserted in the die. Dark T-shaped plugs (near center) are removable and make it possible to cast parts for eighteen different key changes in the same die by removing and inserting other plugs. A set of eight side cores form pin holes used in assembling the halves of the padlock.

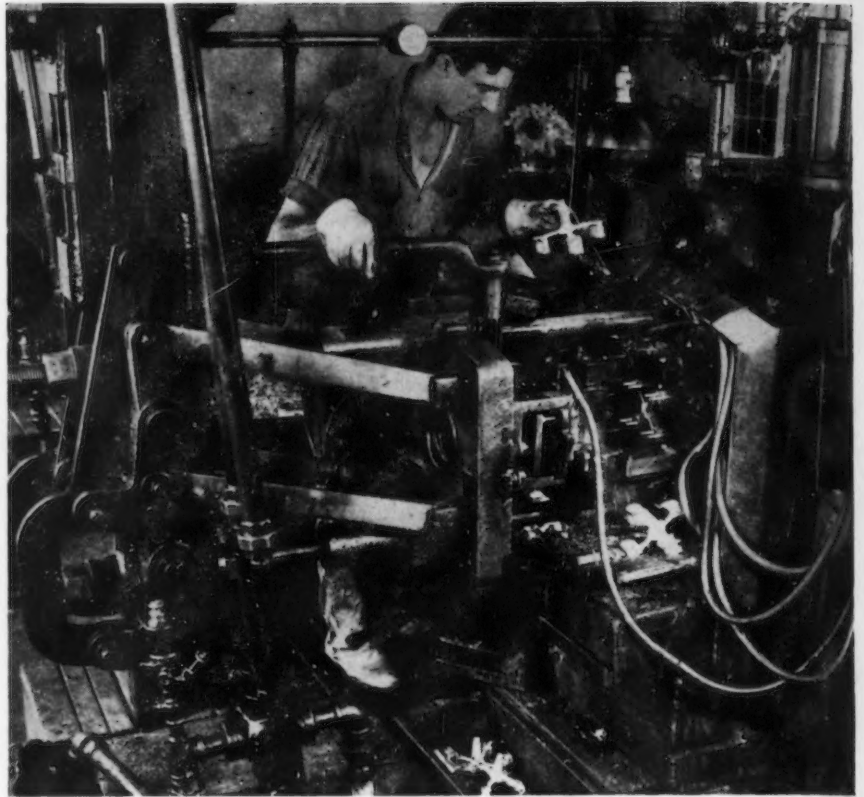
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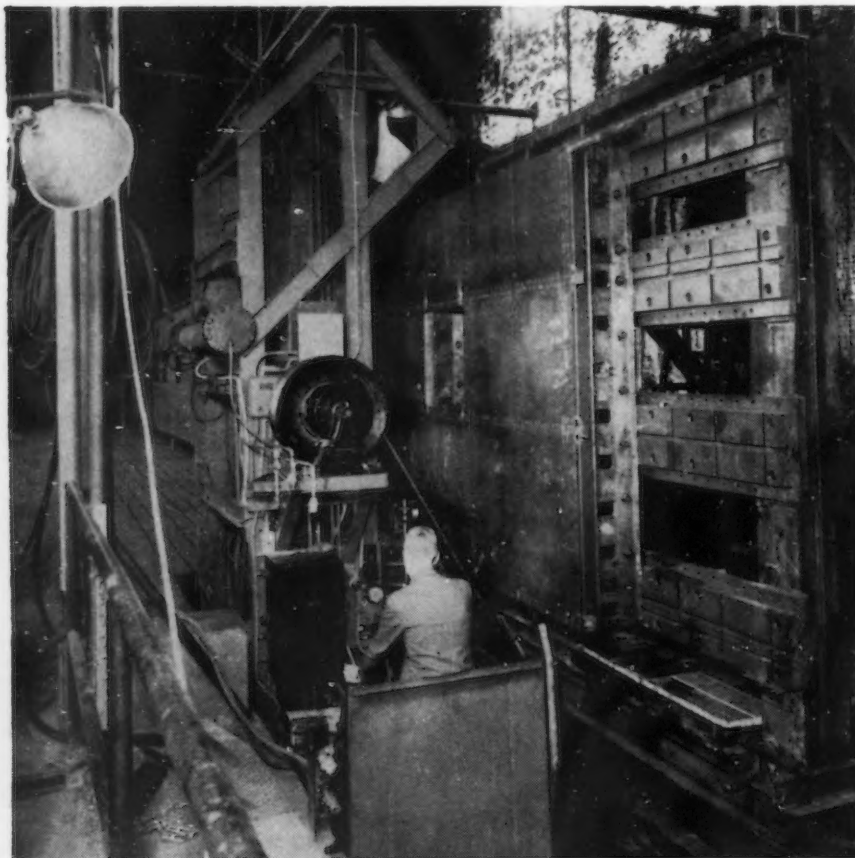
is light or where subsequent machining, in which the flash is cut away, is required anyway.

Motion time analyses have been made on many trimming and breaking-off operations and some special set-ups which facilitate this work are used. In one example, illustrated, gates are set with the sprue in a tubular support around which are placed chutes, usually one for each casting on the gate, with the chute opening directly below the castings. As the latter are broken by an operator's gloved hands, the castings fall through the respective chutes into separate tote boxes below, automatically sorting the castings for subsequent operations.

Certain castings are pushed through shaving dies in punch presses. Many of these set-ups are such that two castings at a time are placed in the die, one with each of the operator's hands, the latter then being free to press the two tripping levers of the press. In at least one instance, the gates coming from one combination die are delivered to a power press in which a chute is set to catch each casting as the press breaks it from the gate, again giving rapid and automatic sorting. (To be concluded)



ONE of the battery of Yale & Towne die-casting machines shown with die open. Ejection of the gate of castings, one of which the operator is holding, is done by the lever in his right hand. Shields are placed all around the die parting.



A SPECIALLY designed electric spot welder in combination with long, vertical side-assembly jigs is being used at the Chicago plant of the Pullman-Standard Mfg. Co. in the assembly of side sheets of refrigerator and box cars in the vertical position after the side frames have been fitted and arc welded. All welded construction results in light weight, low maintenance cost, smooth outer body surface and adequate strength. On cars made thus far the saving is approximately 5 tons per car in dead weight, resulting in an average saving of 54,000 ton-miles per car per year. Accurate timing of the current flow in the welds is assured by General Electric Thyatron controls, which also cause energization of the magnetic contactor at precisely the same point each time in the a.c. voltage wave.

Hard-Facing Problems of Today

By C. C. PENDRELL

Haynes Stellite Co., Los Angeles

WHEN first developed, the hard-facing process was purely a maintenance operation delegated to the welding department. Worn parts were sent to that department to be surfaced with a wear-resistant alloy, and, when renovated, were returned to service. As the savings made possible by hard-facing became more generally known, many plants began to process new parts prior to their initial use. Then, as more and more maintenance departments realized its value, the demand grew until now manufacturers' specifications call for

the use of hard-faced parts in many types of equipment.

Hand-in-hand with this growth have been the improvements in methods and equipment for the correct, efficient application of hard-facing materials. Such improvements benefited manufacturers of hard-facing equipment and their customers equally, for with part manufacture on a production basis, overall time and costs are less, and results in service are more uniform than when occasional parts were hard-faced.

Good results from production hard-

facing methods have been facilitated to a large degree by recent advances in the knowledge of the effects of, and the precautions to be observed during, the application of the welding flame to parts of various sizes and shapes. As in other shop operations, each part to be protected with alloy surfaces must be studied individually and the best method for each worked out accordingly. While the purpose of all hard-facing operations is the same, all seeking to obtain a maximum of wear resistance on the surface with a maximum of toughness in the base metal

FIG. 1—Seating surfaces of most valves for high temperature, high pressure steam service, such as this 9-in. throttling valve disk, are furnished hard-faced by the valve manufacturer. Special jigs facilitate the hard-facing.





FIG. 2—The use of a rotating table jig speeds the hard-facing of undercutter bits for coal cutting machines.

under the facing, differences in sizes, shapes, materials, service requirements, and desired production speeds will necessitate variations in the details of the procedure.

Types of Operations

Generally speaking, hard-facing operations can be subdivided into three classes: manufacturing of new parts, production maintenance, and intermittent job work. The hard-facing of parts for installation in new machinery and equipment is probably the most highly developed and specialized class of operation. Production maintenance, in plants whose shops maintain their own equipment and keep one or several operators full time on the same type of surfacing work, is a close second. Intermittent job work, the hard-facing of individual parts at unspecified intervals—jobs which can be done by either the plant welding department or an outside job shop—is the class of work where procedures are least standardized and practices depend largely upon individual ingenuity backed by recommendations and a general knowledge of welding procedures.

Facing New Parts

Parts falling into the classification designated as manufacturing of new

parts cover a variety of fields. Typical examples which illustrate the diversity of such hard-faced products are gates, disks, needles and the seating surfaces of valves for high-temperature, high-pressure steam, gas, air, oil, or water; exhaust valves and valve seat inserts for internal combustion engines; shaft sleeves and impellers for heavy-duty pumps; oil well drilling bits; type molds; conveyor screw flights; sewage comminuter cutting plates, and even pushcart feet.

An outstanding application of hard-facing materials now on a production basis is the welding of non-ferrous cobalt-chromium-tungsten alloy trim to steam valve seating surfaces. While in some valve manufacturing plants this operation has been standard for high-pressure, high-temperature work for over five years, as shown in Fig. 1, recent specifications calling for hard-faced valves for service at pressures as low as 150 lb. per sq. in. have renewed efforts to speed the operation and reduce valve cost still further.

Exhaust valve seat inserts for internal combustion engines, such as those for service in buses or trucks and heavy-duty gas or Diesel powered stationary engines, are hard-faced before installation in the engine. After rough machining, during which the

seating surface is grooved to provide a substantial support for the alloy deposit, the insert rings are preheated. They are then placed in the chuck of a motor-driven jig while the operator applies the hard-facing alloy by the oxy-acetylene process. An exceptionally smooth deposit is obtained, requiring a minimum of finishing. After slowly cooling, they are ready for finish machining and grinding.

Oil Well Bits

Rotary drilling and coring bits for oil wells are now invariably hard-set and hard-faced before use. In some plants doing this work, all forging, preheating, welding, finishing, and heat-treating processes have been worked out to a high degree of precision. Correct forging and pre-heating conditions have been determined for each steel analysis of which bits are made. Spacing, hard-setting, and bonding of the cast tungsten carbide inserts to the bit have all been very exhaustively studied with regard to the effects of each when the bit is in service. Inserts are now spaced along the cutting edge so that when the areas between them are worn, the inserts project like teeth or fingers, penetrating the formation rapidly. Inserts are also placed in such a way along the reaming edges that bits remain out-to-gage even after drilling many hundreds of feet. When the bit has been completely hard-set with tungsten carbide inserts, it is coated all over with crushed tungsten carbide particles, held in position in a steel matrix, as a further protection.

Homemade fixtures can speed up the hard-facing, if they are adjustable so as to allow the area being welded to be level. When one face of the bit has been hard-set and hard-faced, the bit can be quickly turned over. Carbon blocks are frequently used to limit the extent of the hard materials and thereby shape the bit edges almost exactly. Much finishing time is saved and little or none of the hard alloy is wasted. In addition, gaging members are usually provided on such jigs to aid the welding operator in keeping the blades concentric and true with the threaded box or pin, so that the bits will run smoothly and drill straight holes.

Hard-set and hard-faced in this manner, single bits have drilled from 2000 to 2500 ft. in the East Texas and South Texas fields. Recent performance records of these bits can now be credited very considerably to the use of proper practices in hard-setting and hard-facing which have taken years to develop. Fixtures, templets, carbon molds and other aids now assist in

making the bit dressing operation efficient and economical.

Maintenance Operation

In many cases, parts are hard-faced as a maintenance operation in the plant where the equipment is used. In these cases, too, quantity production, high speed methods are used to gain maximum efficiency. In steel plants, rolling mill guides are one of the outstanding examples of this type of work. Many mills hard-face new guides before putting them in service. The hard-facing alloy is applied to a groove in the face of the guide, located so that the alloy surface receives the brunt of abrasion from the steel passing over the guide. As the cobalt-

alloy are laid parallel to each other across the shoe, forming a solid layer $\frac{1}{4}$ in. deep. Another layer is then applied longitudinally, covering the first layer completely, until the desired depth of deposit is reached. With a relatively smooth deposit, no subsequent finishing is necessary, and the shoes can be used immediately. Ordinary steel shoes wear rapidly because of the abrasion at high temperatures in this service, but shoes hard-faced by this method have a long life. An additional factor in favor of the hard-faced shoes is that the brick furnace floor does not show so much wear as when an ordinary steel shoe is used.

Crane tong points for rasing hot ingots from the soaking pits in bloom-

ing mills are also usually hard-faced by the maintenance department. New tong bits are machined down and the points are rebuilt with hard-facing alloy by means of the oxy-acetylene process. Regularly hard-facing these points in some plants has reduced the tong bit inventory 90 per cent. In addition, because the hard-faced points last 10 to 12 times as long as ordinary steel points, the cranes can be used with very few halts for point replacements.

Hard-facing of undercutter bits for coal cutting machines is a standard operation in coal mines where the coal is reasonably clean and free from boulders or "niggerheads." Thousands of bits are normally used every week, and to keep them sharp and to insure fast cutting, one man must often devote his full time to the hard-facing. Although just a drop of hard-facing alloy is flowed onto each bit—as many as 3000 to 4500 being hard-faced with a single pound of alloy in certain mines—the large number of bits to be tipped necessitates the use of a jig to hold the bits in position and minimize handling time. After considerable experimentation, rotating table jigs have been adopted by some mines, as in Fig. 2, for the bits can be so spaced on the jigs and the jigs so rotated that while one bit is being tipped, the one adjacent is being slowly but adequately preheated by the welding flame. At the same time, the proximity of the bit just faced to the source of heat assures moderate and relatively even cooling. With a suitable jig, an

(CONTINUED ON PAGE 45)



FIG. 3 — Rapid hard-facing of plowshares is accomplished with the aid of a swivel fixture and a copper plate clamped to the nose.

chromium-tungsten alloy used for this purpose has an exceptionally low coefficient of friction, and remains hard even when heated red hot, wear and the constant need for regrinding are cut to a minimum.

When the hard-faced guides are worn, they are reground the same as steel guides, but when they are finally worn out to a point beyond economical regrinding, they are returned to the welding shop and hard-faced again. This method of keeping guides in condition is found to be most economical.

Coke pusher shoes, even latch bars, and carbon scrapers are also hard-faced as a regular maintenance operation in many coke oven plants. The hard-facing of coke pusher shoes is most economical when an unusually thick layer of alloy, about $\frac{1}{2}$ in., is applied all over the bottom of the shoe. By the metallic arc process, beads of

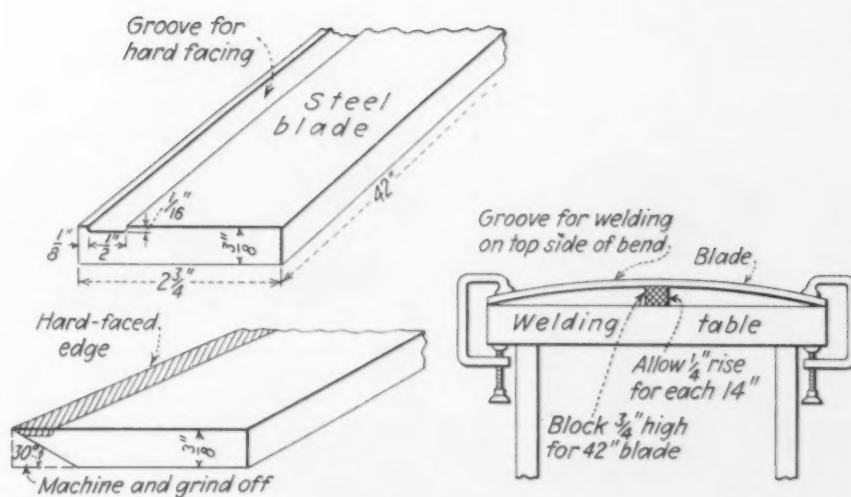
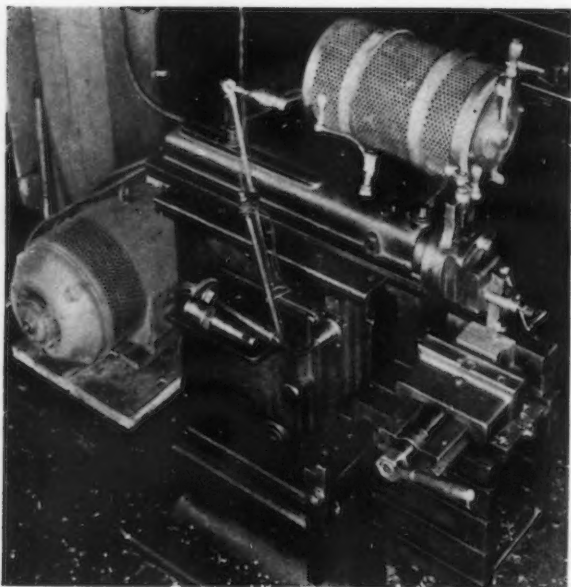


FIG. 4—Hard-facing a roll scraper blade. (Upper left) The steel strip is grooved in preparation for hard-facing; (right) arrangement for bending blade during hard-facing operation; and (lower left) completed blade, showing method of machining and grinding and the final appearance of the sharpened edge.

New Designs in Electric Motors,



ENTIRELY new in principle of operation is a variable speed a.c. induction motor, the most noteworthy motor development in 1938 thus far. Other motors are high torque types, splash-proof, explosion-proof and pivoted base models; also a motor with a herringbone rotor design. Motor starting con-

trollers, large size circuit breakers, a variety of push button stations for special services and a number of electrical auxiliaries are described. Glass fiber tapes are coming into use for heavy duty motor windings. A number of new industrial lighting fixtures are illustrated.

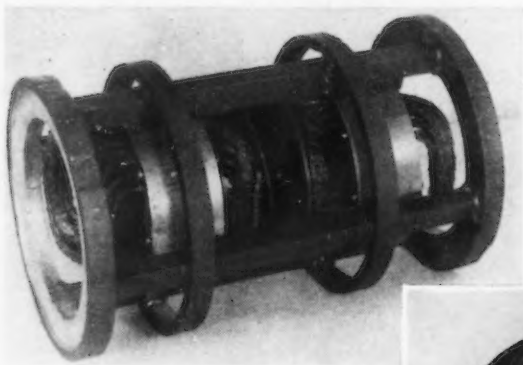
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AT LEFT
CROCKER - WHEELER'S new polyspeed a.c. motor is shown applied to a shaper drive. The speed regulator unit is at the right, convenient to the operator.

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AT LEFT
STATOR or secondary of the speed controller for Crocker-Wheeler polyspeed motor. The secondary windings are connected to brushes on the motor commutator.

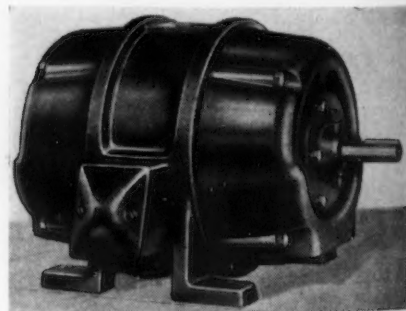
A NEW approach to the problem of variable speed a.c. motors is found in the new polyspeed motors recently announced by Crocker-Wheeler Electric Mfg. Co., Ampere, N. J. Fully continuous speed regulation from 0 to 1800 r.p.m. can be obtained in a three-phase induction motor without rheostat losses. The stator winding is connected directly to the three-phase power line and requires no adjustment. The rotor core has a single winding similar to a d.c. winding and is connected to a commutator with fixed brushes. Speed control is had by varying the voltage across the brushes by means of an induction regulator. The rotor comes up to such speed that the voltage induced in it by the revolving magnetic field created by the field windings is just slightly



TYPE N polyphase induction motors, in range from 1 to 15,000 hp., made by the Burke Electric Co., Erie, Pa., now come in a pivoted base mounting. The pivot is mounted in bronze bushings and no adjustment is required, but the motor has slotted feet for belt adjustment at time of installation. The motor automatically keeps the belt tension in proportion to the load. Pivoted type motors are ball bearing equipped and like other type N models have stator frames of welded steel.



THE Wagner high torque, double capacitor motor has a high capacitance for starting and a low one for running.



CAST iron construction with a baffling system to prevent entrance of water or falling particles and an improved ventilation system are found in the new line of splash-proof motors made by Diehl Mfg. Co., division of Singer Mfg. Co., Elizabethport, N. J. Sealed ball bearings are used. Made in all N.E.M.A. sizes and ratings.

Controllers and Industrial Lighting Equipment

higher than the bucking voltage applied to the motor brushes. By reversing the voltage applied to the brushes, an aiding voltage is applied and speeds 50 per cent higher than synchronous are possible. (Synchronous speed, 1200 r.p.m.). The motor operates at full field and therefore develops full torque over the entire speed range. The efficiency is relatively high at all speeds.

The speed regulator consists of two single-phase induction type voltage regulators placed in one frame, with the two rotors on a common shaft. The primary windings on the rotors are connected to the power source and the secondary stator windings are connected to the brushes. The secondary voltage depends upon the relative position of the primary and secondary coils. When the axis are at right angles, for example, no voltage is induced; when they are coincident, maximum voltage is induced.

High Torque Motor

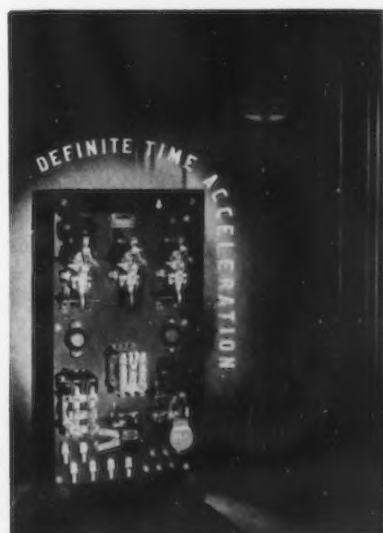
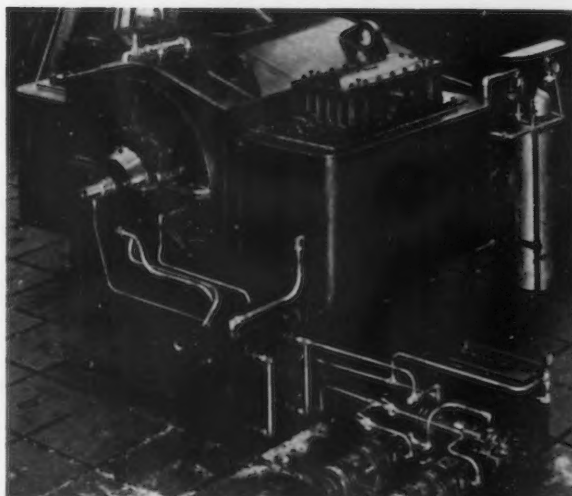
TO their line of single-phase motors, *Wagner Electric Corp.*, St. Louis, has added a high torque, double



CUTLER - HAMMER'S bulletin 9560 a.c. magnetic contactors for small motors come in an "air-styled" enclosure measuring $4\frac{7}{8} \times 7\frac{7}{8} \times 4$ in.

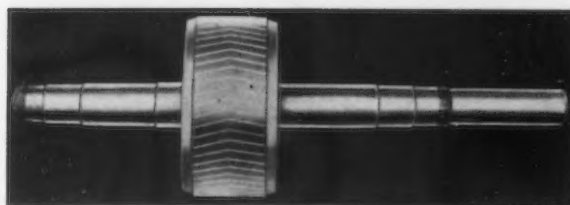
AT RIGHT

A CLOSED circuit system of forced ventilation incorporating surface air coolers and a valve arrangement for continuously injecting a small amount of carbon dioxide gas are found on this General Electric two-pole, 50-cycle induction motor, rated at 1000 hp. at 3000 r.p.m., especially designed for oil refinery service. Because the size is beyond the range of class I, group D explosion-proof motors, special precautions had to be taken to maintain a non-inflammable atmosphere within the motor.



ABOVE

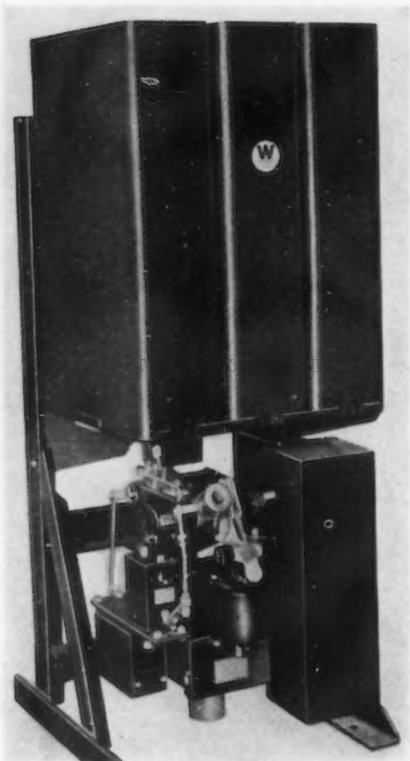
DEFINITE time acceleration is provided in the new line of Cutler-Hammer d.c. heavy duty controllers.



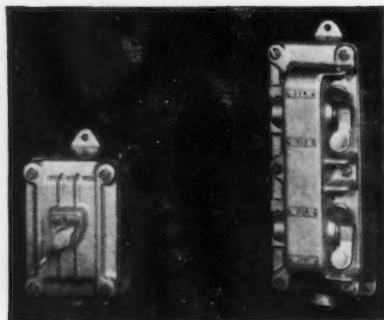
BELOW

A PATENTED herringbone rotor is featured in KLOSD motors made by Sterling Electric Motors, Inc., 5401 Telegraph Road, Los Angeles. Rotor is made of one-piece cast aluminum, dynamically balanced, and is said to reduce eddy currents and iron losses and, by increasing the pull-out torque, improved efficiency and power factor. Mica and asbestos are combined for insulating the stator windings.

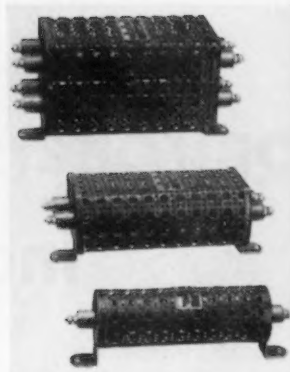
capacitor motor, designated as type RZN when equipped with rigid mountings and type RZNR when equipped with annular resilient mountings. They are available in 1/3 to 1-hp. ratings and for 110/220 volts. There are two condensers, one with a high capacitance for starting and the other with a low capacitance for running. The change in capacitance occurs at approximately 75 per cent full load speed



WESTINGHOUSE type U De-ion air circuit breaker with interrupting capacity of 20,000 arc-amperes at 5 kv.



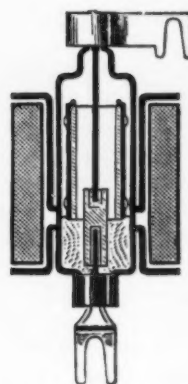
WESTINGHOUSE dust-tight and water-tight heavy duty push button stations are available in one to four units.



HMITE cage type resistors for one, two and four resistors, 1 in. in diameter by 6 $\frac{3}{4}$ in. long.



NEW, compact Westinghouse Silverstat regulator for controlling voltage of small d.c. or a.c. generators.



THE Vertex mercury relay consists of a vertical tube surrounded by a solenoid and containing a cylindrical plunger floating on a mercury bath. When the solenoid is energized, the plunger is drawn downward, thus displacing the mercury, which rises and makes contact with the upper electrode. No tilting is required and the mechanical motion takes place within a hermetically sealed tube. This device is being marketed by Dr. F. Loewenberg, 10 E. 40th Street, New York.

by means of a centrifugal switch. High starting torque with low starting current is achieved, with good power factor and efficiency when running, it is claimed.

Controllers

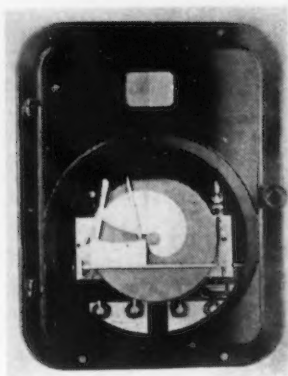
A NEW line of d.c. heavy duty controllers for all machine tool applications, and for heavy duty applications below 10 hp. and general purpose work above 10 hp. is announced by Cutler-Hammer, Inc., 258 N. 12th Street, Milwaukee. Precise, definite time acceleration, which is unaffected by changes in load or temperature, is given by a timing device operating on the principle of a condenser discharging through a magnet coil. Other construction features include: a new styled case; snap-on type cover; a tilting panel frame for quick access to the rear of the panel; wiring trough in the rear compartment; heavy duty contactors and non-breakable, grid type resistors. This line may be had in reversing or non-reversing styles

and with or without dynamic braking. They are available for use with either push button or drum type master switch and in all standard NEMA ratings up to 75 hp., 115 volts, and 150 hp., 230 and 550 volts.

Cutler-Hammer has also introduced a NEMA size O a.c. magnetic contactor for small, continuous duty, single and polyphase motors. It is available in two, three and four-pole constructions, with maximum ratings of 1 $\frac{1}{2}$ hp. for single and 2 hp. for polyphase. All moving parts are pivoted, and the self-aligning armature is said to eliminate sliding friction and allow close guiding of the contact structure. The vacuum impregnated magnet coil has high heat conductivity and will withstand high operating temperatures. The unit is mounted in a compact enclosure.

WESTINGHOUSE ELECTRIC & MFG. CO. announces that its "De-ion" line starter for a.c. motors up to 5 hp., 220 volts, and 7 $\frac{1}{2}$ hp., 440 and 550 volts, is now available in an oversize cabinet providing an unusual amount of wiring space. These starters may be obtained with separate push button, with built-in start-stop push button, or with built-in, hand-off automatic switch.

With the addition of 2500 and 5000-volt indoor circuit breakers to the type U De-ion line, Westinghouse is now able to supply a complete range from 2500 up to 15,000 volts, with interrupting capacity from 75,000 to 500,000 kva. These breakers function in normal atmosphere and feature solenoid operation, universal mounting arrangements, arc resisting contacts, high speed arc control and improved



MILLIVOLTAGES up to the totalized power output of power plants can be telemetered to a distant point by means of the Bristol Metameter.



IN a single unit, a watthour meter and an improved Telechron time-switch register are combined in this type IR-30 unit, announced by General Electric Co., Schenectady. The watthour meter is suited for both large and small single-phase loads, and is available in all ratings, with any one of three registers: single dial with contacts; and double dial with or without contacts.

mechanical construction. They are being used for reversing or primary breakers for steel mill motors and primary breakers for arc furnaces.

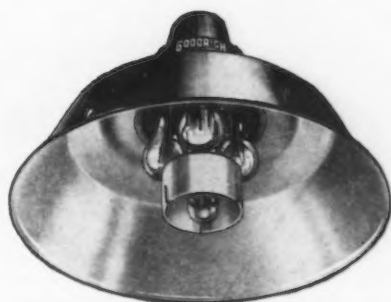
Push Button Stations

DUST-TIGHT and water-tight heavy duty push button stations are announced by *Westinghouse* for service where protection from fumes, dust and moisture is desired and where the stations are subject to rough handling. They will handle control currents of magnetic controllers for large motors where reliability is of prime importance. Stations of one to four units are available. The stations are of heavy cast iron, finished with aluminum paint. Covers are sealed with cork gaskets and oil treated paper, and rust-resisting materials are used throughout.

Westinghouse HD heavy duty push button stations are now offered with mushroom type operating heads for



SYNTHANE (bakelite laminated) insulation is used throughout the Phasetector for detecting potential and indicating phases, particularly in underground systems, made by Railway & Industrial Engineering Co., Greensburg, Pa. The insulation has a breakdown in excess of 25,000 volts.



THE yellow-green light of the mercury vapor lamp in the middle is combined with the predominately red light of the three incandescent lamps surrounding it to give a more normal color of light. A diffusing glass cylinder prevents unpleasant glare. The 24-in. reflector has a white inside and green exterior. This is a product of the Goodrich Electric Co., 2900 N. Oakley Avenue, Chicago.

use where it is more convenient for the operator to control the switch by means of his elbow. It also can be used as an emergency stop button since it can be operated very easily from any angle.

A new line of heavy duty type HD push button stations suitable for use in corrosive atmospheres and in class I, group D hazardous locations has also been designed by *Westinghouse*, with from one to four standard units of the momentary contact type or with maintained contact units. In addition, stations are available with two or three position selector switches. The stations are made of cast iron and all bolts and fittings are of corrosion-resisting copper alloy.

Voltage Regulator

A MODERATELY priced Silverstat regulator in a range of sizes for the automatic voltage control of small a.c. and d.c. generators is being



CORNING Glass tapes are woven from yarns consisting entirely of glass fiber of extremely fine diameter (0.00025 in.) and are being used for electrical insulation.



HINGED dust-tight covers can be had for all circular Benjamin reflectors having a beaded edge where the lamp does not extend below the bead. Covers are regularly supplied by the Benjamin Electric Mfg. Co., Des Plaines, Ill., in plain clear, plain Daylight or Herculite impact-resisting glass. The cover is held by flip-over thumb latches around the rim.

marketed by *Westinghouse*. The regulator is of the direct and quick acting, rheostatic type and controls the voltage by varying directly the resistance in the field circuit. The regulating action takes place only when a correction of voltage is necessary, thus adding to the life of the device. A moving arm actuated by a voltage sensitive coil opens or closes in succession a series of silver buttons mounted on the ends of leaf springs. The buttons are wired in sequence to consecutive steps of a stationary regulating resistance. All resistance can be inserted or cut out rapidly or it can vary gradually in fine steps. There is only one moving part and practically no maintenance is required.

Resistors

A NEW standardized series of ventilated cage type resistors is being made by *Ohmite Mfg. Co.*, 4835 W. Flournoy Street, Chicago. The

cages consist of sheet metal ends with perforated metal sides finished in black wrinkle japan. The terminals are brought out at the ends by feed-through type porcelain insulators.

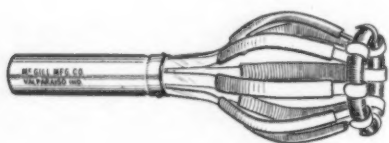
The model P is a new 225-watt rheostat-potentiometer which has been added to the Ohmite line. The resistance wire is wound on a porcelain core and is permanently protected by vitreous enamel. Large copper graphite contacts are used. The model P is regularly supplied with a 3¼ in. bakelite handwheel.

Telemetering System

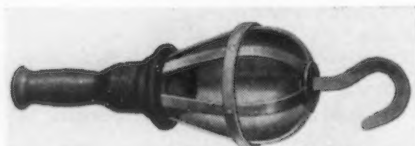
ELECTRICAL units, such as volts, amperes, watts, can be measured and transmitted to a distant point by means of the Metameter, made by the Bristol Co., Waterbury, Conn. The principle involved has been used for a number of years by Bristol in transmitting readings of pressure, temperature, etc., from a transmitter to an indicating receiver some distance away. A cam driven by a constant speed motor gives the electrical impulses required to operate the system. This device is designed so that as it periodically engages and releases the pointer arm of the measuring element, no strain is placed on the element.

Glass Tape

NEW electrical insulating tapes, woven entirely from glass yarns, have recently been developed by the Corning Glass Works, Corning, N. Y.



THIS lamp changer has a powerful coil spring gripper and is made in four head sizes to facilitate handling of lamps from 15 to 1000 watts in size. It is furnished in either the straight or angle adjustment style and is said to remove the tightest fitting lamps. A product of McGill Mfg. Co., Valparaiso, Ind.



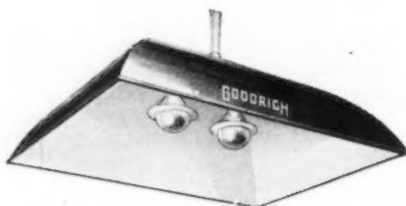
VULCANIZED electrical fiber is used in the construction of this portable lamp guard, made by Safeguard Electric Co., Inc., 1 De Kalb Avenue, Brooklyn. The handle and socket cover are live rubber and are held to the guard by a patented locking ring.



THIS Alzo-Lite medium spread floodlight, a product of the Benjamin Electric Mfg. Co., is for use with 750, 1000 or 1500-watt lamps. It has symmetrical beam with a spread of approximately 65 deg. The reflecting surface is protected against deterioration by the Alzak process.



THE improved String-A-Lite, made by the Sullivan Machinery Co., Michigan City, Ind., consists of No. 10 two-conductor, rubber covered cord on which moisture proof end connectors and lamp socket connectors are integrally molded. Detachable lamp sockets are of molded rubber or bakelite with prong type connectors.

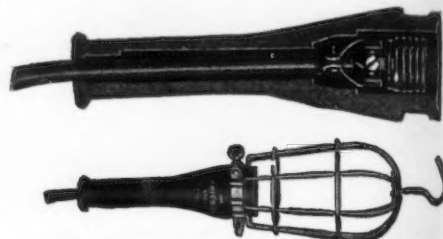


SPRAYLITE is another Goodrich fixture and is designed for producing a soft, diffused illumination for close detail work. The reflector measures 28 x 36 in. and employs two bowl-silvered lamps. It can easily be cleaned with a damp cloth.

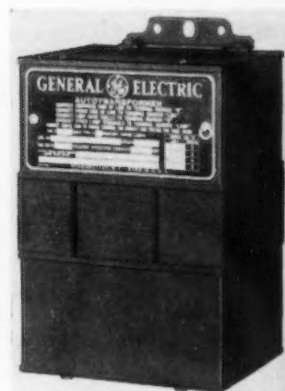
These tapes, with the appearance and flexibility of ordinary textiles, are intended for the insulation of coils for motors, generators, transformers, and for cables and other electrical conductors. As they are composed solely of glass, they not only have exceptional electrical properties and chemical resistance, but have the ability to withstand temperatures far in excess of the limits specified for class B high temperature insulation. They impregnate readily with resins, gums, and varnishes to form an insulation impervious to moisture and of high dielectric strength. The flexibility and textile properties of these tapes are obtained from the extreme fineness of the glass fibres, which is from 1/15 to 1/20 the diameter of a human hair.

Westinghouse has made tests on motors carrying heavy overloads and operating at high temperatures and have found that glass tape will withstand more severe operating conditions than any other insulating medium. It survives high temperatures without losing mechanical characteristics. Its mechanical and dielectric strengths are high and it does not rot or decay. It is moisture and acid proof. A number of coils have been installed with this tape by Westinghouse in mine motors, streetcar motors and on electric locomotives.

A new Deltabeston magnet wire, insulated with fiber glass, has been announced by the General Electric Co., Bridgeport, Conn. Deltabeston glass-insulated wire, like Deltabeston asbestos-insulated magnet wire, is available in round, square and rectangular shapes.



THE rubber handle of this "Super-Duty" portable lamp guard is coated with a baked rubber lacquer to reduce oil and acid deterioration. A heavy duty insert socket is used, with a cord grip clamp which eliminates splicing to take the strain off the connections. The wire guard is secured to the handle with thumb screws. This device is made by the Ericson Mfg. Co., 4720 Euclid Avenue, Cleveland.



TWO 400-watt type H mercury vapor lamps can be operated at peak efficiency and at 90-95 per cent power factor with this TuLamp transformer, made by the General Electric Vapor Lamp Co., Hoboken, N. J. Starting currents using these transformers are below the normal operating current. The new unit is 1½ in. wider than the single lamp transformer, but is practically the same in general design.

Hard Facing Problems of Today

(CONTINUED FROM PAGE 39)

operator at one mine was able to face 450 bits per hr.

Specialized Applications

The hard-facing of plowshares is an entirely different operation, at least with regard to production requirements. At present, plowshares are hard-faced by hundreds of small welding shops throughout the country. Some of these shops hard-face and sharpen as many as 1000 shares during a single season. The procedure which has been worked out for this work, however, is well standardized. In many cases, as in Fig. 3, a copper plate is used as a mold to form correctly the hard-facing alloy applied to the nose, and swivel fixtures are available to allow the share to be held in a position most convenient for the operator. The fixtures are a real help because much time is saved in making adjustments to keep level the spot at which the operator is working. Another operating kink that aids in smoothing the deposit and reducing finish-grinding time and expense is to wipe off excess hard-facing alloy. The deposited alloy is heated locally with a large flame and, just as the surface begins to melt, the flame is quickly removed and the rod is wiped across the melting area to remove the high spot. Care must be taken not to heat clear through the deposit, but just to melt the surface layer which is to be removed. With these aids, shops with some experience can hard-face a 14-in. share in 10 or 12 min. welding time.

A steel mill maintenance job of an intermittent job nature is the hard-facing of the two 13-ft. blades of a resquaring shear for cold shearing galvanized sheet. The 0.40 to 0.50 per cent carbon steel blade is placed on a long jig made by welding braces all along an H-column. The blade is held in alignment by bars bolted to the jig. The bars or hold-down clamps, at 8-in. intervals along the blade, are successively removed and reclamped as the work progresses. Hard-facing alloy is applied to the two grooves on one side of the reversible blade by two operators working simultaneously. When the first side is completed, the blade is turned over, and the two grooves along the other side are hard-faced in the same way. Upon cooling, the excess steel stock on the edges is machined off, down to the hard-facing alloy in the grooves. Then grinding leaves the blade with four square cor-

ners of well supported hard-facing alloy. During the hard-facing process, the blade shrinks about $1\frac{1}{2}$ in. in length, so the bolt holes for clamping the blade to the shear are not drilled until other work has been completed.

An unusual method has been found quick and efficient for hard-facing small parts like belt rivet heads. They are placed in the holes of a perforated plate with their shanks dipping into a container of water. The tank is filled with water until it reaches to within $\frac{1}{8}$ in. of the bottom sides of the rivet heads. Each rivet head is then covered with hard-facing alloy by the oxy-acetylene process. Quick cooling after hard-facing is assured and no subsequent heat treating or finishing is necessary.

An ingenious preheating arrangement has been devised for heating the bars of rock bar screens or grizzlies prior to hard-facing. Heating is accomplished while the bars are separated and individually supported on notched asbestos boards. Electrical contacts from a heavy-duty arc welding machine are applied to each end of the bar, and with a current of 600 amp. through the usual size bar, $\frac{1}{4}$ x 1 in. x 8 ft., obtained with approximately 30 volts, a bar is heated to a dull red heat in from $3\frac{1}{2}$ to 4 min. Hard-facing alloy is applied to the full length of the top of each bar by the oxy-acetylene process, and when all the bars have been hard-faced, they are assembled on the frame.

An excellent method has been developed for hard-facing flour mill roll scraper blades. The scrapers, which when finished are $2\frac{1}{2}$ in. wide and hard-faced along the top edge, are made from strip steel $2\frac{3}{4}$ in. wide and $\frac{3}{8}$ in. thick. The steel strips are cut to the proper length—in this case, 42 in.—and grooved on one side. As shown in Fig. 4 the groove is $1/16$ in. thick and $\frac{1}{2}$ in. wide, extending the full length of the blade $\frac{1}{8}$ in. away from the edge.

During the hard-facing operation, the blade is clamped at both ends to a welding table. A block under the center of the blade gives a reverse curve to the side which is to be Haynes Stellite. In this case, the height of this curve amounts to $\frac{1}{4}$ in. in every 14 in. of total length— $\frac{3}{4}$ in. for a 42-in. blade. The method of mounting is also shown in Fig. 4. This manner of bending the strip during the welding operation has been found to overcome

subsequent warpage. The C-clamps are removed immediately after welding is completed. As it cools, the blade returns to a flat position, or is still slightly bowed and is straightened by pressure until flat. This method of application puts the hard-facing material under compression. If the blade is lying flat during the welding operation, it will curl up; in straightening, the hard-facing may crack.

After the strip has cooled, the edge is machined off at a 30-deg. angle up to the underside of the Haynes Stellite. From this point, it is ground to the desired size and shape. The metal removed by machining and grinding and the cross-section of the finished blade are shown in Fig. 4. It has been found that this method insures sharpness of the finished blade, and a substantial edge is produced with a minimum waste of hard-facing alloy.

Other Surfacing Methods

In some cases, where, because of design or material limitations, it is not advisable to apply the full heat of the welding flame, other methods, which achieve the same result as hard-facing, are found as satisfactory. A problem of this type in connection with turbine blade shielding has been satisfactorily solved by silver soldering. Stainless steel blades for high speed, high pressure service are shielded with a strip of a rolled wear-resisting alloy. The alloy employed is one of the tougher grades of cobalt-chromium-tungsten hard-facing material which fortunately can be hot rolled to a certain extent. Strips formed from the rolled alloy are silver soldered to the leading edge of the stainless steel blades, nearest the outer ends. Blades protected in this manner are proving very satisfactory in high efficiency turbines operating at tip speeds in excess of 1000 ft. per sec.

Another method of protecting parts with hard-facing alloys is employed on centerless grinder rests. The rests, of steel, are made approximately $\frac{1}{2}$ in. less in height than their finished dimension. Cast bars of cobalt-chromium-tungsten alloy are then brazed to the steel support. Upon finish grinding, the composite rest possesses a hard alloy strip on the section subject to most abrasion, yet the cost is very reasonable because only a small amount of the alloy is used—the largest part of the rest being of an inexpensive carbon steel.

These few examples, chosen at random from a variety of industries, indicate some of the problems encountered and how they have been solved.



THIS picture shows a workman pouring the molten steel into one of the experimental centrifugal molds. The molds revolve under heavy protective covers.

Ford Casts

By WILLIAM F. SHERMAN
Detroit Editor, The Iron Age

SPINNING molten steel at high speeds to form cast steel parts of improved quality is one of the most recent experimental developments of the Ford Motor Co.

The experiment represents a new advance in the art of steel casting, a field which Ford has pioneered with such successful innovations as the cast steel crankshaft and the alloy steel piston.

"The centrifugal casting experiment has been confined so far largely to blanks for transmission cluster gears and ring gears," R. H. McCarroll, Ford metallurgical engineer, said in describing the development. "In both cases it has been entirely successful resulting in stronger, lighter, and less expensive gears than are produced by the conventional forging method."

"Important advantages are obtained

by whirling the dies rather than by pouring the metal into a stationary mold," Mr. McCarroll said.

"In the first place, centrifuging insures a sound casting, free of blow holes and shrinks," he said. "But still more important is the fact that any remaining dendretic formation, or crystal structure in the metal runs perpendicular to the forces the gear teeth will be subjected to in actual use. In a forging, on the other hand, the flow lines formed during forging are parallel to the lines of force. Therefore the centrifugally cast steel gear is stronger than the forged gear."

In centrifugal casting the metal is taken directly from the melting furnace to the mold, and approximately 3 min. later the gear blank emerges. The simplicity and low cost of this operation is in contrast to the forging

method. In it the metal is taken from the melting furnace, poured into ingots, put through the soaking pit to bring it up to the proper heat, and then run through rolling processes during which about 25 per cent of the metal must be cropped off and remelted. This necessitates three reheatings, and a fourth metal loss in the forging operation.

"In centrifugal casting we eliminate the risers and feeders required in conventional casting in order to distribute the metal properly in the mold. In the spinning mold the centrifugal force takes care of feeding the shrinking metal. In this way we avoid the large quantities of back stock, or steel scrap that must be remelted, which are typical of conventional steel casting operations. In fact we have only a small sprue or gate to remelt. It

Ring Gears in Centrifugal Molds

amounts to less than 5 per cent of the metal poured."

Mr. McCarroll said the saving in weight of the cast gears was due to the fact "we can put the metal where we want it." It also is possible to hold the dimensions much closer than in the case of forgings, leaving considerably less excess metal to be machined off the gear blank. The only sand cores required are those used where undercuts are desired for reasons of design, and to take care of shrinkage

between prominent protruding parts of castings.

The company's experience with casting these parts centrifugally extends back a full year, he said. At first the molds were spun at speeds ranging from 400 r.p.m., to as high as 1800, but 600 r.p.m. for the ring gear blank and 800 for the transmission gear blank have proved the most satisfactory.

"There have been, and still are, a lot of problems to solve, since we are

exploring new ground in much of this work," he said. "However, we are convinced the principle of centrifugal casting is entirely practicable and we now are developing multiple centrifugal molds to put the operation on a production basis."

Ferracut Machine Co. 75 Years Old

FERRACUTE MACHINE CO., Bridgeton, N. J., is this year celebrating its 75th anniversary. The business was founded in 1863 as a general machine shop by the late Oberlin Smith, its early products including gas and steam fittings, iron work, iron fence, etc. The manufacturer of power presses, which is the company's principal activity today, was begun in 1876.

On Jan. 1, 1877, the company was incorporated as the Ferracut Machine Co. Ferracut is derived from the Latin, "ferrum cuteo," meaning "I cut the iron." Ferracutus was the name of a ferocious giant supposed to have lived in medieval times.

Ferracut presses have been developed in recent years to do a great variety of work. Some of the largest jobs are the stamping in one piece of metal boats, bathtubs and coffins. From these the products range down to such precision work as parts for watches, adding machines and sewing machines.

In 1937 controlling interest in the company was purchased by George E. Bass, who is its president. Associated with him are many of the men who have been active in the company for years, including Henry A. Jaavier, vice-president; Luther C. Meyers, general manager, and Philip M. Meyers, superintendent of works.



IN this picture, the ring gear blank is being removed from the mold. Approximately three minutes are required to produce the gear blank. The mold is spun at the rate of 600 r.p.m. for the ring gear and at 800 r.p.m. for the transmission cluster gear blank.

... THIS WEEK ON THE

... Unexpected sales volume swells production total for July and extends schedules ... Change-over for 1939 models already underway ... Some plants to be closed first half of August ... General Motors division at Dayton tooling up for bearing manufacture, probably in new plant ... Ford steel mill expected to resume operations Aug. 15.

DETROIT.—The old model year has run its course—without remorse—as far as most automotive men are concerned. Among suppliers of material, parts and equipment there is no talk now of the past year's ups and downs. In its place is a sharper interest in the prospects for the year which will begin for them in August as new model work gets underway.

Production in the last weeks of the 1938 model year rose to unexpected heights, reaching the highest level since the final week in May. During the past week, the automobile industry's output totaled 42,010 units, according to Ward's Automotive Reports. This compares with the output of 25,375 passenger cars and trucks in the previous week and 115,380 in the corresponding week a year ago.

Contrary to expectations just two months ago, assembly lines in most of the automobile plants are remaining active, although some of the smaller plants have already begun to close and the major lines will shut down next Friday, with the first two weeks of August to be devoted to inventories and retooling in the plants of the major companies. The sharp increase in production last week was attributed to a sudden spurt in incoming orders for cars and resulted in extensions of original closing dates in some cases. The current week will show a decrease of some 5000 units or more, with a much more rapid decline in the last week in July. Output probably will be only a few thousand units per week by early August.

A Ford spokesman made the forthright statement more than a week ago that assembly at the Rouge would end

with July. Two weeks' inventory is planned, beginning Aug. 1. It is assumed that when production is resumed on Aug. 15 in the parts divisions, it will take two or three weeks to build up enough inventory of parts for sub-assemblies to get the Rouge and branch plant assembly lines going again.

Steel Plant to Resume Aug. 15

The Detroit steel operating rate possibly will show an increase Aug. 15 because about that time it is anticipated that Ford Motor Co. will resume an active schedule. The open-hearth furnaces at the Rouge have been cold since the last week of March. So far there has been no indication of immediate steel buying at the Rouge. In fact, it has been hinted that Ford requirements will not be put in the form of an inquiry for about three weeks.

News of Chrysler's impending shutdown came in the form of an official statement which merely stated:

"Our retooling program for next year is now underway and during the change-over period, which will take place later, more than 15,000 people will be at work in our plants. We have designated the first week in August as our inventory period, but work necessary to build the 1939 models will continue."

Even before that statement to the press had been digested in the automobile capital, men close to the automobile industry knew that Chrysler's final assemblies were ending in the last week in July. New equipment such as drying ovens for bodies and sheet metal (see last week's Assembly Line) is scheduled to be in place by Aug. 15. Production of parts and

sub-assemblies will begin about that time. The first complete bodies will be delivered in the last 10 days of August, and complete resumption of production is expected by Sept. 1.

General Motors, which has divisions much more decentralized than the other two manufacturers, was unable to give specific shutdown dates for its plants. Besides, as announced recently by President William S. Knudsen, the shutdowns will vary from plant to plant, and in most cases will be departmental rather than plant-wide. Factors which will affect the timing of the shutdowns will be the amount of change in new models and the number of orders on the books in each division. But in general, GM's change-over period will begin Aug. 1 and will occupy from three to six weeks.

The situation for all of the Big Three then is about the same. Production will drop sharply between now and Aug. 1. The shutdown will be almost universal in the first half of August. Parts production and sub-assemblies will begin to show signs of life about the middle of August with general resumption of automobile production planned for Sept. 1.

Moraine Products to Buy Tools

At Dayton, the Moraine Products Division of General Motors, which has manufactured large quantities of bushings, is entering a new field of babbitt bearing manufacture. A complete retooling program is about to be launched and the Moraine lobby is soon going to be a meeting place for machine tool dealers. The extent of the new program is apparent since it has been learned that probably a new plant unit will be erected to house the equipment which will be bought.

Announcement that Chrysler is changing from lacquer to synthetic paint for 1939 created quite a furore last week in this city. Chrysler has used a nitro-cellulose base lacquer or duco on all of its cars except the Plymouth on which a synthetic paint or enamel has been used. Now all of the other Chrysler cars will appear with the same finish as that on the Plymouth. It is a synthetic base which uses a combination of soy-bean oil and chinawood oil. Chinawood oil is sim-

ASSEMBLY LINE

By W. F. SHERMAN
Detroit Editor

ilar to tung oil, as it comes from the same "family." The source of supply for the finish will not be changed, Ditzler Color Co. retaining the contract it had last year.

The principal reason for making the change is the lower cost of the material and the lower cost of application. With the new synthetic paint, evaporation plays only a small part in the drying, much of the drying being due to oxidation and other reactions so that the chemical composition of the hard finish is different from that of the undried paint. Considerably more heat is required to bake this enamel. It gives a good appearance but is difficult to "touch up" or repair.

Rumor has it that Briggs, on the verge of losing Ford body business, because bodies will be built at the Rouge, will compensate for the lost business by putting in equipment to build a new front suspension system for the Ford car. So far there has been no hint as to what the new suspension will be. It is known that 1939 Fords will use transverse springs, long associated with Ford suspension, and will have a tubular front axle.

Design Changes

Incidentally it was noted here a few weeks ago that Ford would use this tubular axle. Since then it has been learned that ever since 1938 models were put on the market some of them have been sold with tubular front axle and some with the I-beam. When Ford goes "100 per cent tube" on the 1939 models, he will have a well-proved axle design. Also recently it was revealed that Chrysler would make a change to coil suspension. This will probably mean an increase of more than 1,600,000 coil springs used in the next year, if Chrysler production runs in the 800,000 range as it did in 1936-1937.

Despite the large number of coil springs that are in use, the leaf spring has by no means been buried. In the years of 1934 to 1937, inclusive, approximately 11½ million new cars were registered in the United States domestic market. Of these, 4,818,863 were equipped with front coil springs but all of the 11½ million had rear leaf springs. The following estimates

have been made by the Leaf Spring Institute to show the trend:

	New Cars Registered	No. of Leaf Springs As Original Equipment	No. of Coil Springs As Original Equipment
1934	1,888,557	4,567,500	2,025,672
1935	2,743,908	7,528,320	1,792,328
1936	3,404,497	9,571,719	2,515,240
1937	3,442,118	9,490,246	2,728,450
Total	11,479,080	31,157,785	9,061,690

J. H. Shoemaker, executive secretary, summarizing this, said: "There were a total of 40,219,475 springs used as original equipment and placed in the service field. Of these 31,157,785 were leaf springs, compared with 9,061,690 coil springs."

Increased Sales of Cars

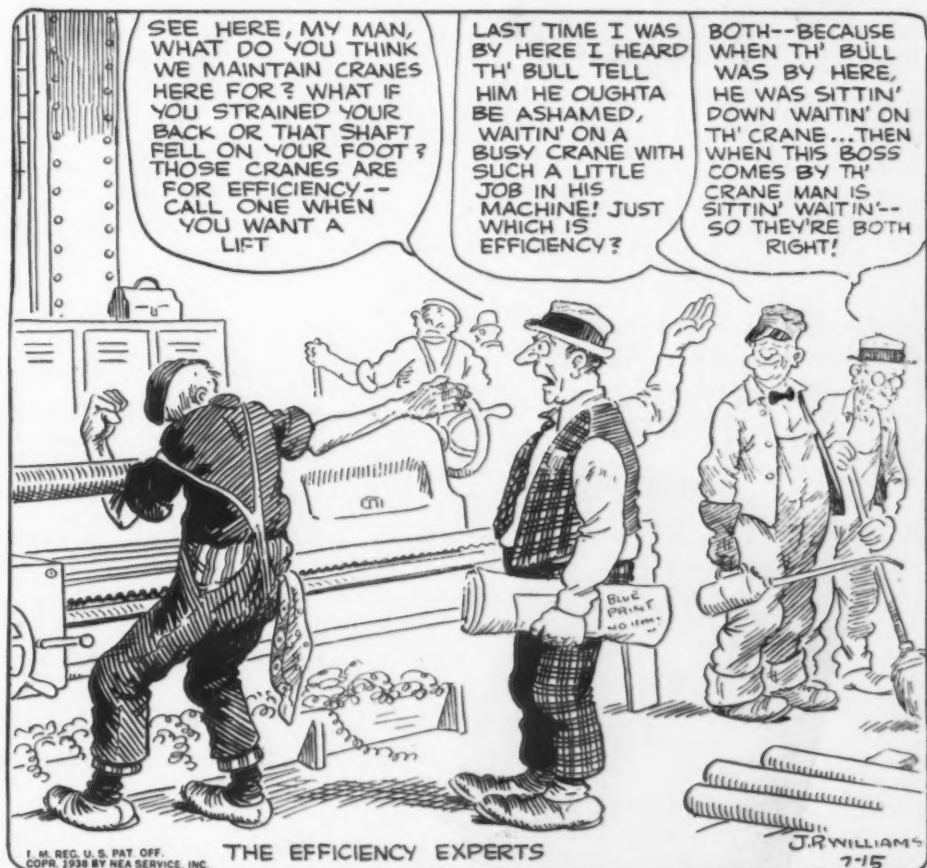
Sales reports and final figures on registrations for June are just coming in. R. L. Polk & Co. estimates the total new passenger car registrations

in the United States in June at 56,000, on the basis of data from 26 states. The indicated decrease is 12.07 per cent from registrations in the same area in May. New truck and commercial car registrations in the same 26 states show a decrease of 11.89 per cent from May, with the total truck sales estimated at 32,000.

Final reports for June by Federal Motor Truck Co. show that this concern is 10 per cent ahead of the corresponding figure for May. The volume, according to K. M. Schaefer, general sales manager, is the best for any month since March. Since new models for trucks are generally announced in January, it is expected that the truck business will show continued improvement. R. W. Ruddon, president of Federal Motor Truck, announced that the factory would continue to operate four days a week through the summer months.

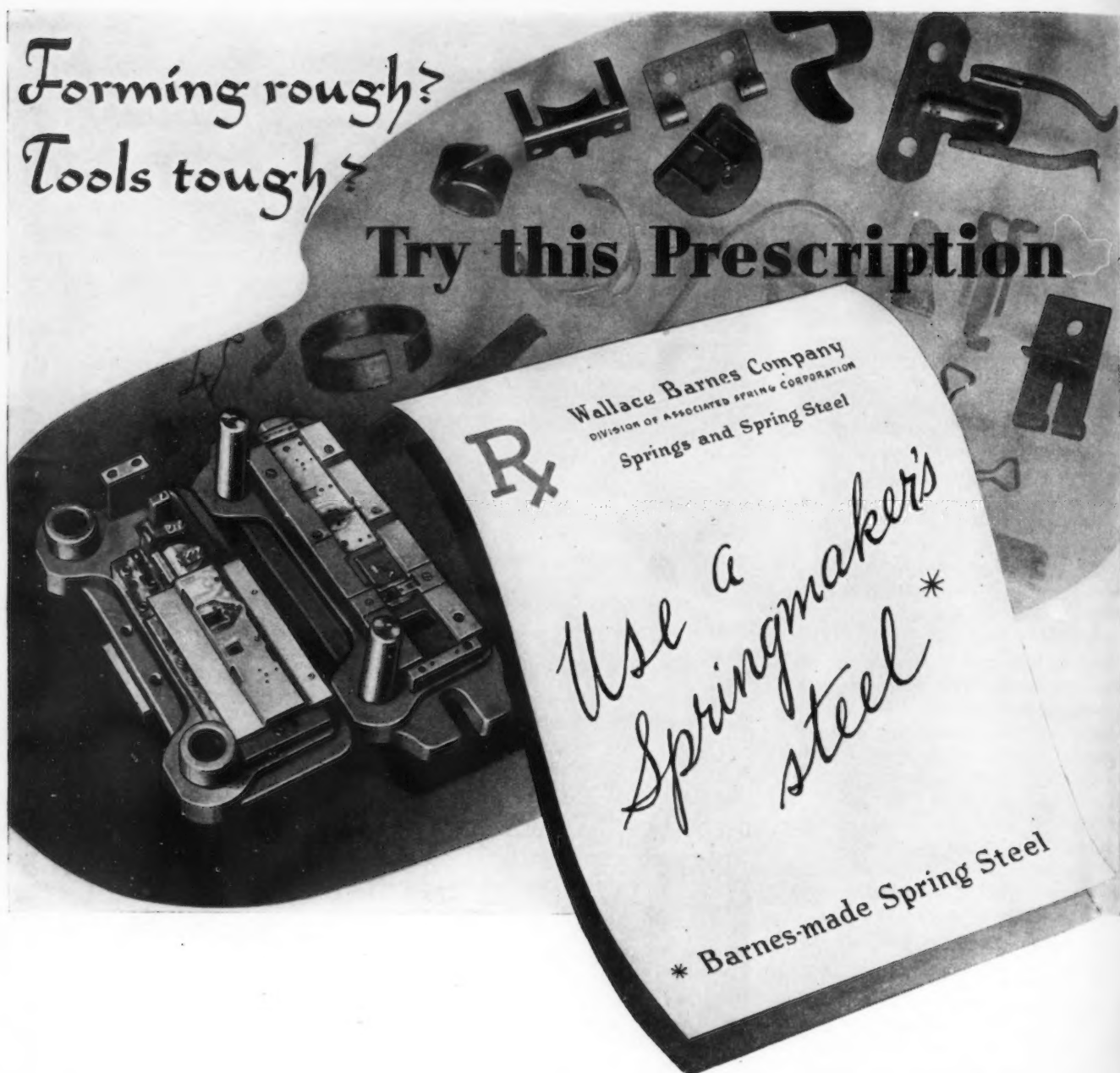
THE BULL OF THE WOODS

BY J. R. WILLIAMS



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Tools tough?

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Wallace Barnes Company
DIVISION OF ASSOCIATED SPRING CORPORATION
Springs and Spring Steel

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Springmaker's
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* Barnes-made Spring Steel

Ample warehouse stocks insure prompt deliveries . . . Write the Steel Sales Department for a list of sizes . . . or a quotation.



Barnes-made Spring Steel gets the toughest test of all right in our own plant. We not only make it—we use it! Finicky attention is paid to accuracy to size, forming, hardening and fatigue properties. Ours is *not* a tonnage mill, spring steel is the only product. If you believe, as we do, that good material is the best kind of economy, let Barnes-made Spring Steel be your next order.

WALLACE BARNES COMPANY

Division of Associated Spring Corporation
BRISTOL, CONNECTICUT

SPRINGS • SPRING WASHERS • WIRE FORMS • STAMPINGS • SPRING STEEL

Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources

	June 1938	May 1938	April 1938	May 1937	Five Months 1937	Five Months 1938
Steel Ingots: (gross tons)						
Monthly output ^a	1,638,277	1,806,805	1,925,166	5,151,909	24,574,237	9,180,867
Average weekly output ^a	381,883	407,857	448,757	1,162,959	1,138,750	.....
Per cent of capacity ^a	28.46	30.39	33.44	88.79	84.86	.....
Pig Iron: (gross tons)						
Monthly output ^b	1,062,021	1,255,024	1,376,141	3,537,231	16,599,087	6,811,005
Raw Materials:						
Coke output ^c (net tons)	.....	2,341,021	2,510,964	4,803,467	23,221,269	13,102,116
Lake ore consumed ^d (gross tons)	1,471,660	1,711,146	1,853,658	5,321,011	24,715,312	9,244,627
Castings: (net tons)						
Malleable, orders ^e	.....	17,564	19,724	46,018	291,717	94,477
Steel, orders ^e	.....	20,636	21,869	68,688	540,373	.....
Finished Steel: (net tons)						
Trackwork shipments ^a	2,942	2,633	3,793	8,807	54,814	17,036
Fabricated shape orders ^f	.....	74,410	92,130	122,939	723,247	388,261
Fabricated plate orders ^g	.....	25,141	21,958	28,913	216,412	126,400
U. S. Steel Corp. shipments ^h	.....	465,081	501,972	1,304,039	6,345,724	2,532,297
Fabricated Products:						
Automobile production ⁱ	.....	210,183	238,133	540,377	2,396,315	1,116,633
Construction contracts ^j	\$251,006	\$283,156†	\$222,016‡	\$244,113‡	\$1,176,377‡	\$1,046,600‡
Steel furniture shipments ^k	.....	.....	.....	\$2,259‡	\$11,483‡	.....
Steel boiler orders ^e (sq. ft.)	.....	733,678	474,931	1,015,282	4,793,138	2,884,516
Locomotives ordered ^k	.....	5	3	14	206	44
Freight cars ordered ^k	.....	6,114	3	3,903	44,562	6,933
Machine tool index ^l	70.2	66.7	90.3	208.5	227.6†	75.7†
Foundry equipment index ^m	.....	90.6	79.3	237.6	248.1†	94.9†
Exports: (gross tons)						
Total iron and steel ⁿ	.....	540,639	489,202	969,211	2,716,041	2,603,658
All rolled and finished steel ⁿ	.....	109,459	129,252	164,215	731,297	617,168
Scrap ⁿ	.....	371,745	306,900	630,671	1,620,114	1,624,795
Imports: (gross tons)						
Total iron and steel ⁿ	.....	20,814	21,237	49,050	252,843	103,098
Pig iron ⁿ	.....	1,795	3,823	6,361	52,324	19,465
All rolled steel ⁿ	.....	16,194	12,761	29,031	147,273	71,186
British Production: (gross tons)						
Pig iron ^o	541,500	633,900	661,000	696,300	3,311,700	3,463,900
Steel ingots ^o	776,100	957,000	938,000	1,047,300	5,232,000	5,149,800

† Three months' average. ‡ 000 omitted.
Source of data: * American Iron and Steel Institute; ^b THE IRON AGE; ^c Bureau of Mines; ^d Lake Superior Iron Ore Association; ^e Bureau of the Census; ^f American Institute of Steel Construction; ^g United States Steel Corp.; ^h Preliminary figures from Automobile Manufacturers Association—Final figures from Bureau of the Census, U. S. and Canada; ⁱ F. W. Dodge Corp.—37 Eastern states; ^j Railway Age; ^k National Machine Tool Builders Association; ^l Foundry Equipment Manufacturers Association; ^m Department of Commerce; ⁿ British Iron and Steel Federation.

Weekly Booking of Construction Steel

	Week-Ended				Year to Date	
	July 19, 1938	July 12, 1938	June 21, 1938	July 20, 1937	1938	1937
Fabricated structural steel awards	7,900	8,000	8,800	22,300	373,125	692,040
Fabricated plate awards	3,485	1,815	6,500	1,310	74,535	78,360
Steel sheet piling awards	790	0	0	0	29,285	30,520
Reinforcing bar awards	19,910	15,930	7,125	6,820	155,765	139,515
Total Lettings of Construction Steel..	32,085	25,745	22,425	30,430	632,710	940,435

THIS WEEK IN WASHINGTON

... Steel shares front pages with the weather as rumors flood Washington and various New Deal agencies push that industry into changing roles in the political "summer theater" ... Stipulation speeds Bethlehem-NLRB case.

By L. W. MOFFETT

Resident Washington Editor
The Iron Age

WASHINGTON.—Steel again is spotlighted on the Washington stage. Steel itself is big, and its very name as well as its importance acts as a magnet that draws it to prominent pages of the daily press where it is splashed freely these days. It is being rolled into many roles. Coupled with the Federal Administration policy it is made the leading character just now in a politico-economic play. It was represented as the star performer in the forthcoming monopoly investigation at the direction of Government mentors. Certainly there was and there still may be good reason for the characterization. Then along came what to the public was a sudden and surprising announcement not only of reduction in steel prices but more important of a sweeping change in price policy. It was a widely reflected press view that these broad moves had a political color. They were supposed to have been made to assuage Washington's deep displeasure, from the White House down, at steel prices and the steel pricing policy.

Now It's LaFollette

Whereupon, breathtakingly, steel was given tentative Administration blessing via Irritable Ickes, who with other high Government functionaries, frequently enjoyed laying down heavy political barrages against steel. At the moment that pastime is being monopolized by LaFollette's Senate Civil Lib-

erties Committee as the "little steel" strike again is being "probed."

On the offside as a variation there is the incongruous spectacle of NLRB, CIO affiliate, forced to at least recognize the complaint of Clyde A. Armstrong, Weirton Steel Co. attorney, "disbarred" by Trial Examiner Edward G. Smith, CIO McCarthy, who refused to bargain collectively with the Weirton lawyer.

Occasionally the Administration attacks were stimulated to a more realistic status. These were in the nature of investigational propellants by way of White House-sponsored Federal Trade Commission and Department of Justice "studies."

Then, steel, so it was said, by reducing prices placated wrathful Washington. No longer was the industry to be the big bad wolf to be hunted down ruthlessly by the monopoly investigators but was to be treated lamb-like. Next, the reading public was informed—if not misinformed—that the Department of Justice had promised steel virginal absolution, entire freedom from an inquiry, if it maintained wages, a suggestion that SWOC is, through White House influence, seeking to have transformed into fact by the Public Contracts Board.

Under the Walsh-Healey Act, industry can be compelled to say "uncle" or else no Government business. That sort of thing unfortunately is a big part of business these days. Even though Government press agents have over-propagandized its importance to such industries as steel. Forgiving officials at the Department of Justice humorously said they were convinced that the scriveners of the report of immunity for steel wage maintenance had not consciously put that high law enforcement department into the black-mailing business. Which is not to

deny CIO-SWOC pressure through the Government to maintain steel wages.

Steel Psycho-Analyzed

There was also the diverting, not to say untamed, report that, quickly reversing its economics, the Administration saw the necessity of not only preserving but embracing big business, rather than "decentralizing" it as a sin and bringing the fragments down to the size of smaller competitors. The more steel was studied the tougher the big business problem got, so it was reported. Steel, the public narrative went on to say, was psycho-analyzed as a natural monopoly. The rest was simple, to paraphrase the enervating weather report. A "combine" between the White House and big steel was worded by columnar endeavor. Big steel was to gather into its fold all the "little steel" plants, and under the benevolent guidance of the Federal Government a regimented steel industry was to be set a-humming merrily. More than that it was the precursor to a utopian solution of the very, very vexing "monopoly" question. Also there is the story that the Government is subtly moving in to nationalize steel—and all other basic industries.

Arnold Denies All

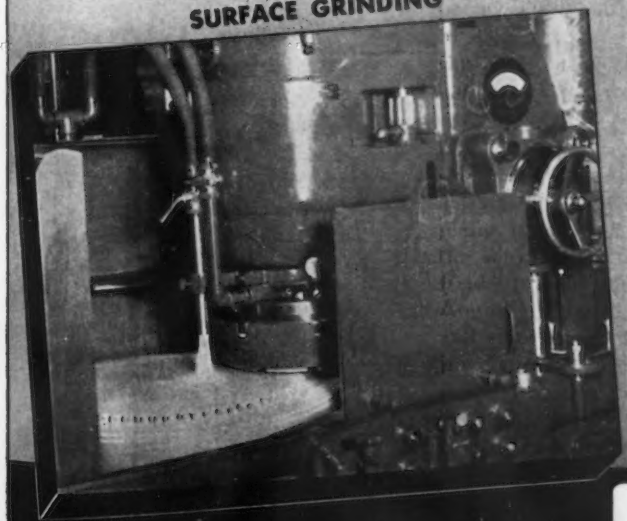
Further, there is the tale that—But space limitations, to say nothing of the character of the rumors, agreeably forbid an ad infinitum discourse. Ridiculous! That was the way the rumors were branded by Thurman W. Arnold, Assistant Attorney General in Charge of the Anti-Trust Division, Department of Justice. Manifesting mild exasperation, Mr. Arnold told THE IRON AGE that there are many idle reports being circulated about the Government's attitude toward steel and industry generally. Picking out one of the stories about steel, Mr. Arnold pooh-poohed the statement that the Administration considers the steel industry as a "natural monopoly."

As for the forthcoming monopoly investigation Mr. Arnold insisted with emphasis that it is not to be a witch hunt but will be constructive only. He also said that steel had not been listed as the first industry to receive the attention of the committee. Until



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arrangements have been completed, he stated, it is not known what the specific program for hearings will be.

Even as Mr. Arnold was talking to THE IRON AGE he had in preparation a statement denying rumors that the Anti-Trust Division will use the monopoly investigation as an instrument to obtain evidence for prosecution. He said that the method of obtaining evidence of this kind will continue to be the grand jury investigation.

FTC Issues Cease and Desist Order Against Snow Fence Manufacturers

WASHINGTON.—The Federal Trade Commission has issued a cease and desist order against the United Fence Manufacturers Association and eight producers of snow fence, charging concerted efforts to maintain identical delivered prices in

violation of the FTC and Robinson-Patman acts.

Specific practices which are attacked by the commission and which, the FTC said, are to be discontinued in order to comply with the order include (1) quoting and selling at delivered prices which are identical either at the same destinations or throughout a given zone or area; (2) promoting discrimination in prices realized f.o.b. point of shipment through any agreement resulting in quoting and selling at delivered prices that are identical at any given destination; and (3) promoting such discrimination in prices where the effect is to lessen competition among respondent members or to create a monopoly. Twelve other specific practices were held to be in violation of the law under the commission's order.

Conclusions drawn by the FTC were that the alleged practices had been injurious to the public and tended to lend encouragement to "similar impairment of competition in other industries."

The commission said the respondents admitted "the material allegations of the complaint in the case." The respondent companies which, the FTC said, manufacture 90 to 95 per cent of snow fencing produced in 14 States extending from Maine to Virginia, include:

Mattson Wire & Mfg. Co., Joliet, Ill.; Nebraska Bridge Supply & Lumber Co., Omaha; Rowe Mfg. Co., Galesburg, Ill.; H. R. Lindabury & Sons, and the New Jersey Fence Co., both of Burlington, N. J.; Illinois Wire & Mfg. Co., Joliet, Ill.; Buffalo Industrial Co., Buffalo; Leon L. Hutchinson, Pavilion, N. Y.; and Stewart W. Adams, Oxford, N. Y.

Bids Requested on Three Battleships

WASHINGTON.—The Navy Department has advertised for bids to be opened Oct. 5 for the construction of three 35,000-ton battleships. Officials estimated the steel requirements at 42,000 tons of armor plate and 33,000 tons of plain steel for the three vessels. A fourth battleship of the same size is expected to be constructed at the Norfolk, Va., Navy yard.



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Stipulation Pushes Bethlehem, NLRB Case Nearer Conclusion

WASHINGTON. — Bethlehem Steel Corp. and employee representation plan groups in nine plants, the National Labor Relations Board and the SWOC have entered into a stipulation which, board officials said, will save five months of time and 20,000 pages of testimony in the NLRB's 10-month-old complaint case against the company.

As outlined by board officials, the stipulation provides that the company abandon its effort to subpoena SWOC Secretary David McDonald, and that it agree to include a history of the employee representation plan in the record.

Bethlehem attorneys were given until Aug. 17 to file briefs after Frank Bloom, NLRB trial examiner, announced he would prepare a report as soon as possible on the 13,000 pages of testimony already introduced.

SWOC Seeks Sole Bargaining Right

The case, based on SWOC allegations that Bethlehem dominated its "employee representation plan," was aired at hearings which started Sept. 8, 1937, and temporarily ended in April, 1938, pending the time attorneys could agree on stipulations. The stipulations just announced closed the hearings permanently.

Still pending is the so-called representation phase of the Bethlehem-SWOC controversy under which the SWOC seeks sole bargaining rights for 55,000 Bethlehem workers in 14 plants. Board attorneys said hearings on this question will not be held until a decision is reached in the complaint case.

Andrews Is Wage-Hour Law Administrator

WASHINGTON. — President Roosevelt has named Elmer F. Andrews, New York state industrial commissioner and New Deal Democrat, as administrator of the new wage-hour law.

The new appointee, a former civil engineer and from 1929 to 1933 the assistant industrial commissioner of New York, has been the industrial commissioner ever since Frances Per-

kins was designated United States Secretary of Labor. He is credited with drafting the New York unemployment insurance system, and was an active supporter of the new national wage-hour act although he opposed the wage differential feature

contained in the bill as finally enacted.

Andrews, who nevertheless believes the new law will put a stop to migration of industries in search of cheaper labor, has served as labor adviser for the old National Labor Board in Southern coal fields, as United States delegate to the International Labor Conference, and as the spearhead of successful drives toward enactment of New York's labor relations, minimum wage and workmen's compensation laws.



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Republic Steel Hearings Before NLRB on Aug. 11

WASHINGTON.—The National Labor Relations Board has scheduled oral arguments for Aug. 11 on the proposed findings against Republic Steel Corp., which is charged in a reopened case with having violated the Wagner Act.

The board denied the plea of Luther Day, Republic counsel, for additional time and fixed Aug. 6 as the deadline for filing briefs in support of exceptions to the proposed findings.

The intermediate report, filed in an attempt to bring the NLRB procedure into line with the Supreme Court's Kansas City Stockyard decision, would require, as did the April 9 ruling, that the company reinstate 5000 strikers in its Ohio plants and disband its employee representation organization.

Czechoslovakian Steel Output Turns Upward

WASHINGTON.—Pig iron output in Czechoslovakia totaled 110,000 metric tons in May, 1938, compared with 104,000 tons in April and 143,000 tons in May, 1937. Crude steel output totaled 177,000 metric tons in May compared with 147,000 tons in April and 189,000 tons in May, 1937, according to the Department of Commerce. The May upswing ended a five-month decline.

June Building Contracts 4% above Those of May

REVERSING the usual seasonal trend, building contracts awarded in 37 Eastern States during June showed the largest dollar volume of any month this year, according to F. W. Dodge Corp. The June total of \$167,485,000 was 4 per cent ahead of May, although 23 per cent behind June of last year. On the other hand, heavy engineering construction amounted to only \$83,803,000 in June, being 32 per cent less than the May figure and 16 per cent under the June, 1937, figure. The accumulation of building and engineering contracts for first half year is \$1,294,272,000, the highest for any first half since 1931, with the exception of last year.

Percy M. Brotherhood & Son, machine tool dealers and agents, have transferred their offices from 114 Liberty Street to the South Ferry Building, 44 Whitehall Street, New York.

..PERSONALS..

GEORGE P. PASSMORE has been appointed manager of manufacturing, steam division, South Philadelphia works of Westinghouse Electric & Mfg. Co., succeeding A. R. ALLARD, who has resigned to accept a vice-presidency of General Steel Castings Corp. Mr. Passmore, a graduate of Drexel Institute, has been with Westinghouse since 1921, in capacities of shop foreman, tool designer, layout draftsman, superintendent of tool design and superintendent of heavy manufacturing.



G. P. PASSMORE

N. A. HOLMER, who has had long experience in sales merchandising work, has been appointed general sales manager of the Mid-State Steel & Wire Co., Crawfordsville, Ind. M. C. MASON and H. E. NICKLOY will continue as sales managers in charge of their particular assignments.

♦ ♦ ♦

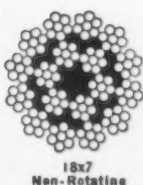
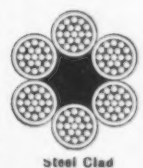
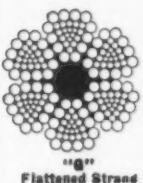
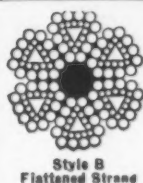
CHARLES M. GRIFFITH, vice-president in charge of trackwork sales for the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has retired after more than 50 years of continuous service. He will be available in a consulting and advisory capacity. His former duties will be assumed by J. A. KRUGLER, general sales manager of the company.

♦ ♦ ♦

ALEXANDER G. CHRISTIE, professor of mechanical engineering at Johns Hopkins University, has been nominated as president of the American Society of Mechanical Engineers, New York. HENRY H. SNELLING, senior member of Snelling & Hendricks,

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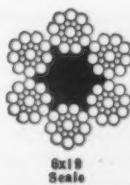
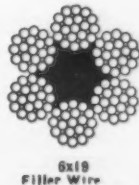
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Washington, has been nominated to serve one year as vice-president; W. LYLE DUDLEY, vice-president in charge of design and sales, Western B'ower Co., Seattle, has been nominated to serve as vice-president for two years. Also nominated to serve as vice-presidents for two years were JAMES W. PARKER, vice-president and chief engineer, Detroit Edison Co., Detroit; ALFRED IDDLES, application engineer, Babcock & Wilcox Co., New York. CLARKE FREEMAN, vice-president in

charge of fire prevention engineering and underwriting, Manufacturers Mutual Fire Insurance Co., Providence; WILLIS R. WOOLRICH, dean of engineering, University of Texas, Austin, Tex., and WILLIAM H. WINTERROWD, vice-chairman, Franklin Railway Supply Co., Chicago, have been nominated as managers to serve three years.

♦ ♦ ♦

DR. COLIN J. SMITHELLS, of the research laboratories of the General Electric Co., Ltd., of England, is to

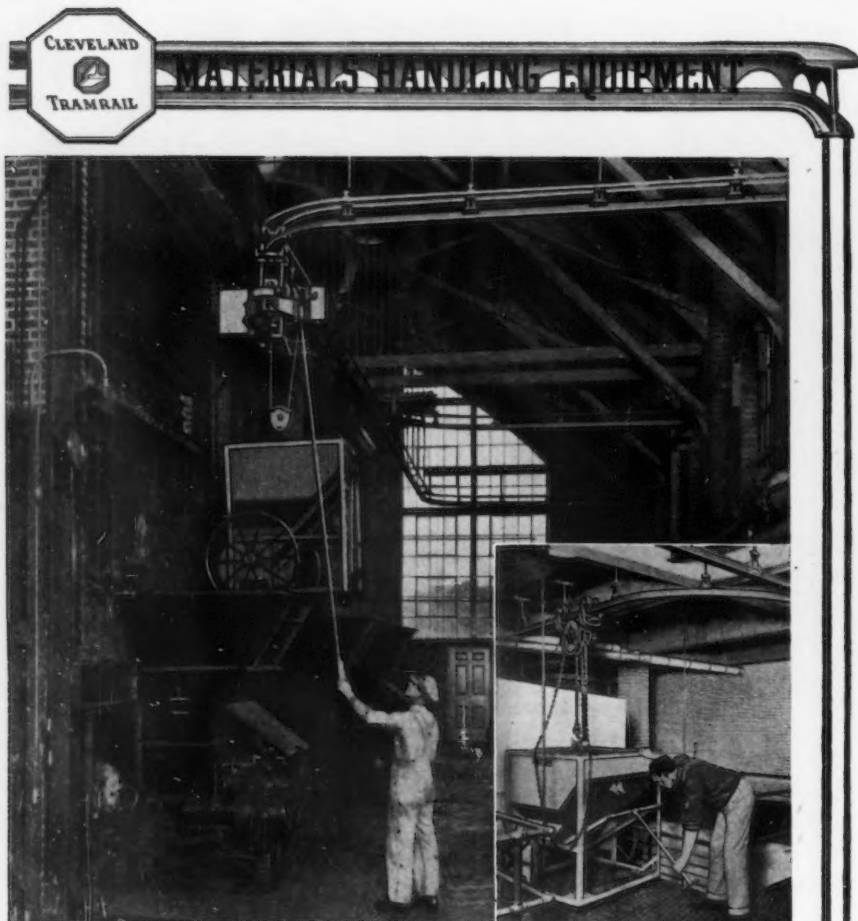
address the October meeting of the Notre Dame chapter of the American Society for Metals, on Oct. 14 on "Powder Metallurgy—The Structure of Sintered Metals and Alloys."

♦ ♦ ♦

RAYMOND SZYMANOWITZ, formerly technical director of Acheson Colloids Corp., Port Huron, Mich., has been made vice-president and technical director of Acheson Industries, Inc., technical development company for the Acheson interests.

♦ ♦ ♦

WILLIAM C. SIMPSON, who has been identified with the Lukens Steel



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W. C. SIMPSON

Co., Coatesville, Pa., for the past four years, has been appointed manager of sales of the newly-opened Pittsburgh sales office in the Gulf Building by the Lukens company. He was graduated from Lehigh University in 1932 with a degree in metallurgical engineering and early in 1933 joined the Sparrows Point plant of Bethlehem Steel Co. He resigned to join the Lukens organization in 1934 and served as research engineer in the metallurgical department, research metallurgist in the research department and in the sales and sales development department.

♦ ♦ ♦

E. A. RUTLEDGE, manager of the Wheeling Corrugating Co. plant at Martins Ferry, Ohio, has been named assistant to the general manager of the Benwood plant of the Wheeling Steel Corp.

EDWIN C. BARRINGER, editor of *Daily Metal Trade*, Cleveland, has been appointed executive secretary of the Institute of Scrap Iron and Steel, New York, to succeed BENJAMIN SCHWARTZ, who recently asked to be released from his contract. Mr. Barringer will take office on Aug. 15. He has devoted practically all of his business career to the publication field, following work at the Case School of Applied Science and Western Reserve University, Cleveland. During 1912 to 1917 he was political reporter for daily newspapers in Cleveland and Columbus. He joined the Penton Publishing Co. in 1917 and was Washington and Chicago editor of its publica-



E. C. BARRINGER

tions, managing editor of *Steel*, and editor of *Daily Metal Trade* since May, 1936.

♦ ♦ ♦

A. T. KELLER, chief engineer of construction, Bethlehem Steel Co., and for 50 years identified with the steel industry, will retire from active service on Sept. 1. He will be succeeded by R. B. GERHARDT, who is assistant chief engineer of construction. G. S. COMSTOCK will assist Mr. Gerhardt as assistant chief engineer of construction.

Mr. Keller started as a draftsman in 1888 with the Mackintosh-Hemphill Co. He later became identified with the Mesta Machine Co. and was chief engineer of the Gary plant of United States Steel Corp. during its construction. He went with the Bethlehem Steel Co. in 1916 as chief engi-

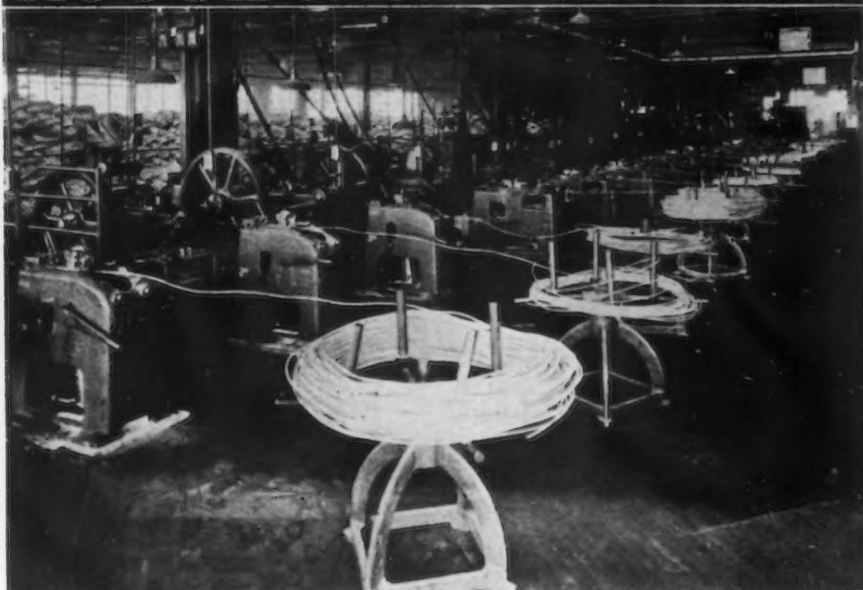
neer in charge of the rebuilding and expansion program of the Maryland plant. Four years later he was transferred to Bethlehem as chief engineer of construction for all the plants of Bethlehem Steel.

Mr. Gerhardt started work in the electrical department of the Steelton plant in 1907 after his graduation from Cornell University. He was later promoted to the superintendency of that department at Sparrows Point. In 1923 he was appointed assistant

general manager of the Maryland plant and five years later was transferred to the Steelton plant in a similar capacity. He went to the Bethlehem plant in 1936 as assistant chief engineer of construction.

Mr. Comstock started with Bethlehem in 1917 in the mechanical department of the Bethlehem plant. He was then transferred to Steelton as assistant mechanical engineer and is at present superintendent of power and maintenance at Steelton.

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... THE NEWS IN BRIEF ...

No complete shutdown of automobile plants as change-over operations will be staggered. Unexpected sales volume swells July production. Ford steel mill expected to resume operations Aug. 15. Page 48.

Steel shares front pages with the weather as rumors flood Washington and various New Deal agencies push that industry into changing roles in the political "summer theater." Page 52.

Basing Points, Old and New, are shown with a map inserted next to page 74.

Federal Trade Commission issues cease and desist order against the United Fence Manufacturers Association and eight producers of snow fence, charging concerted efforts to maintain identical delivered prices.—Page 54.

Navy Department advertises for bids on three battleships; it is estimated that 42,000 tons of armor plate and 33,000 tons of plain steel are required.—Page 54.

Five months of time and 20,000 pages of testimony saved as Bethlehem Steel Corp. and the National Labor Relations Board enter into a stipulation in the 10-month-old complaint against the company.—Page 55.

New York State industrial commissioner named administrator of the new wage-hour law.—Page 55.

Pig iron output in Czechoslovakia turns upward in May, ending a five-month decline.—Page 56.

Reversing the usual seasonal trend, building contracts in 37 Eastern States during June show the largest dollar volume of any month this year.—Page 56.

Republic Steel Corp., charged with violating the Wagner Act, will

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CONVENTIONS

- Sept. 26 to 30—Association of Iron and Steel Engineers, Cleveland.
- Oct. 10 to 14—American Institute of Steel Construction, French Lick Springs, Ind.
- Oct. 12 to 15—The Electrochemical Society, Rochester, N. Y.
- Oct. 13 to 15—Society of Automotive Engineers, aircraft production meeting, Los Angeles.
- Oct. 17 to 21—National Metals Congress, Detroit.
- Oct. 17 to 20—American Institute of Mining and Metallurgical Engineers, Detroit.
- Oct. 31 to Nov. 2—National Foreign Trade Council, New York.
- Dec. 5 to 10—Exposition of Power and Mechanical Engineering, New York.

reopen the case with oral arguments Aug. 11.—Page 56.

Ohio steel consumers greatly benefited by creation of New Deal basing points.—Page 62.

Another classic example of National Labor Relations Board "justice" will be found on page 64.

New tin plate-making patent has been awarded to Blaw-Knox Co. on a method of producing tin plate by electroplating.—Page 65.

Brunner Mfg. Co. states there is no truth to the rumor that it will move from Utica, N. Y.—Page 65.

Industrial advertisers to hear Tom M. Girdler in Cleveland Sept. 21.—Page 65.

\$3,400,000 order goes to General Electric Co. and Westinghouse Electric & Mfg. Co. for electrical equipment for 20 high-speed passenger locomotives for the Pennsylvania Railroad.—Page 65.

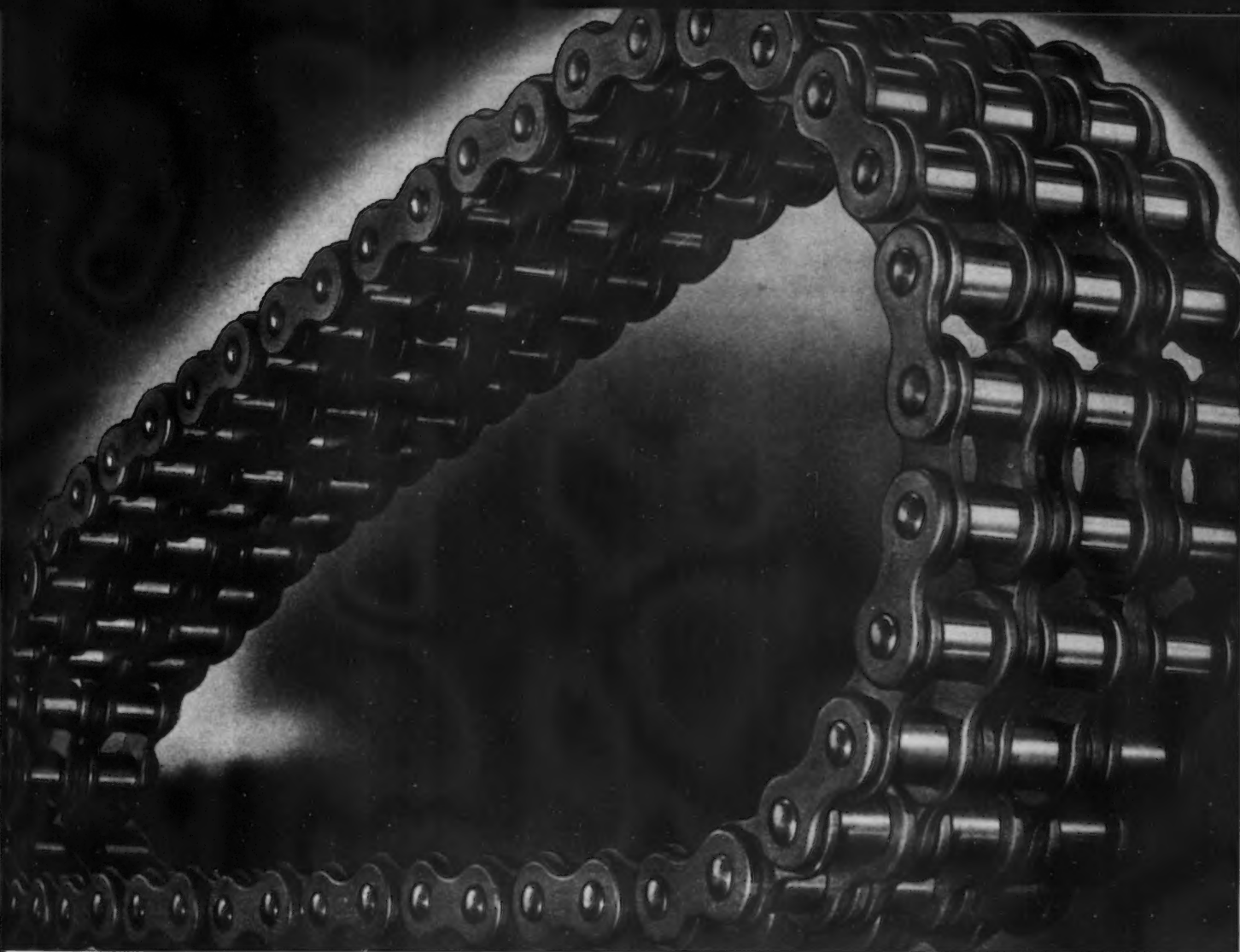
Machine tool inquiries gain in some districts. Domestic orders still light, but show small increase in the East. The June index figure is 70.2 compared with 66.7 in May.—Page 85.

10 CIO pickets sentenced to 20 to 120 days for contempt of court in Chicago.—Page 75.

Move for slash in South's rail rates may involve wages.—Page 80.

Girdler "not raising apples", Republic tells LaFollette. Page 73.

Railroad Wage Cut Conference being held. Page 73.



POWER *Flows Smoothly* ON WHITNEY CHAINS

Smooth flow of power—and elimination of power transmission troubles—are built into every link of Whitney chains. For chain making at Whitney has always been a matter of sound engineering: carefully selected materials, and accurate manufacturing methods that guarantee full machine capacity, minimum maintenance.

Whitney roller and silent chain drives respond instantly to sudden power demands—maintain constant speeds without slippage

—serve every power transmission need from fractional horsepower to several hundred horsepower. Whitney conveyor chains keep production on the mark—meet an unusually wide range of materials handling applications.

Whitney's long service record in every industry more than justifies your consulting Whitney on your chain drive requirements. Write for Whitney catalogs on roller, silent, and conveyor chains, sprockets, and flexible couplings.

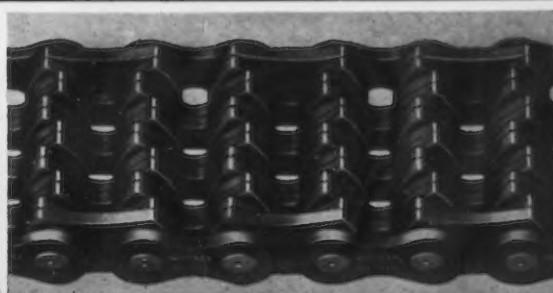
WHITNEY CHAINS

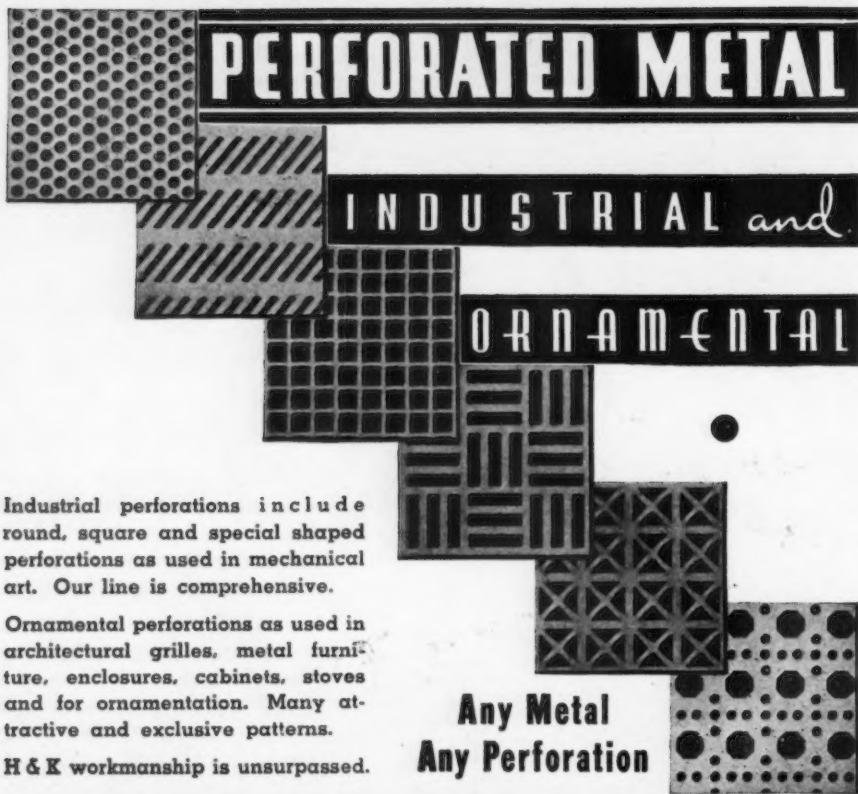
WHITNEY CHAIN & MANUFACTURING CO., HARTFORD, CONNECTICUT, U. S. A.

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Industrial perforations include round, square and special shaped perforations as used in mechanical art. Our line is comprehensive.

Ornamental perforations as used in architectural grilles, metal furniture, enclosures, cabinets, stoves and for ornamentation. Many attractive and exclusive patterns.

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from Every Type of Wire up to & including 1/2 dia.

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AMERICAN SPRING AND MANUFACTURING CORPORATION

PARK AVE. HOLLY MICHIGAN

Ohio Steel Greatly Benefitted of New

By D. R. JAMES
Cleveland Editor, *The Iron Age*

• • •

CLEVELAND.—While Ohio steel producers study their new advantages and limitations and their probable needs over the long term for construction or transfer of facilities, attempts are being made now to retain as many markets as possible, with considerable attention directed to the South.

By reason of its numerous lake front and inland steel producers of varying size, this state is a cross section of the Northern steel industry where many of the ramifications accompanying the equalization of base prices are readily apparent.

Ohio now has more bases than ever before and, as elsewhere throughout the steel industry, it is apparent that all producers now have a lesser return from the new set-up, some being hit harder than others, depending upon locations and costs.

Producers do not regard the present situation as stable and are awaiting developments. The break-even point having been raised to around 60 per cent operations, and the volume of orders failing to show any marked spurt, relief is considered very necessary from the burden of lower prices and increased freight absorptions.

Ohio's Lake front producers get their ore cheaply and will be able to use the water for shipments of their finished steel products as they have been doing. There is plenty of shipping capacity available, some of it now laid up. The use of ships has limitations, of course, and requires anticipation of consumer needs, being suited to large quantities only.

The Valley producers have the river available to the South and are closer to the coal fields. Hopes have been aroused in the Valley that some of the opposition to the long proposed canal from Youngstown to Lake Erie may be removed.

One of the first possibilities to be singled out for discussion has been

Consumers by Creation Basing Points

the need of the major Ohio producers for flat rolled capacity near Chicago or Detroit, but an immediate move along this line is generally considered unlikely. The long range outcome as to how much scrapping or abandoning of present facilities would be required is difficult to appraise.

Ohio Consumers Will Save

Producers were quick to protect their own backyards by establishing new flat rolled bases at Youngstown, Cleveland and Middletown. Under this new arrangement numerous consumers will save money. For example, a sheet consumer in Warren, Ohio, will save \$3 a ton from the Pittsburgh base, in view of the establishment of a Youngstown base.

Fortunately, there are many consumers in the State. Many of them are benefited if reasonably close to mills and their own consuming markets. In other instances, however, the eastern and southern equalizations of mill prices have given a decided advantage to Ohio fabricators engaged in distant competition.

Cleveland mills will have a lesser return by 17.5c. per 100 lb. on Cleveland business. From Youngstown to Cleveland, Youngstown mills formerly added 20c. per 100 lb. and allowed 13c., the freight from Youngstown to Cleveland, thus picking up 7c. But now only the 2.5c. switching charge can be added, and the 13c. freight must still be allowed.

Certain mills outside the State which formerly were at a disadvantage now can be expected to put more sales effort into certain localities. For instance, even though Cleveland is the base for Toledo on plates, Chicago mills are likely to become more active there, for the rate of 26c. per 100 lb. is the same from Chicago and Pittsburgh.

Middletown Base Aids Dayton

Dayton, Ohio, consumers of sheets will benefit greatly through the new Middletown base. The rate from Middletown to Dayton is 6.5c. On bars, however, Middletown is not a base and there will be greater compe-

BALDWIN-DUCKWORTH IN YOUR INDUSTRY

Roller Chain Drives will save money.
Use the type that our 40 years of experience recommends for your needs.
BALDWIN-DUCKWORTH CHAIN CORPORATION
Springfield and Worcester, Massachusetts

Call the
B-D MAN

MANUFACTURERS WIRE

Products or parts made from wire usually can be made better or more economically — often both — by taking advantage of the correct combination of composition, temper, finish and shape offered by Continental's wide variety of specialized wire for manufacturing. Furnished in special-analysis open hearth steel; also in *KONIK, a patented steel containing copper, nickel, and chromium.

CONTINENTAL STEEL CORP.

General Offices: Kokomo, Indiana
Plants at Canton, Kokomo, Indianapolis

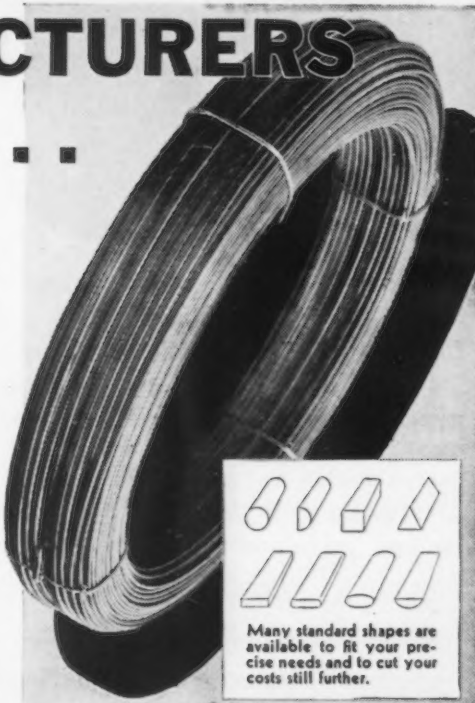
OPEN HEARTH STEEL

Wire: Bright Basic, Annealed, *Konik, Special Manufacture, Galvanized, *Flame-Sealed.

Wire Rods, Nails, Staples, Bale Ties, Barbed Wire, Fence—15 Types; Gates and Fittings.

Sheets: Black, Galvanized, Special Coated, Roofing and Siding—14 Styles.

*Trade Mark Reg. U. S. Pat. Office.



Many standard shapes are available to fit your precise needs and to cut your costs still further.



tition. Rates to Dayton are: from Cleveland, 23c.; from Youngstown and Chicago, 26c.; from Detroit, 24c., and from Pittsburgh, 27c.

Middletown enjoys a low rate of 19c. to Indianapolis, while the rate to that city from Chicago is 23c.; Detroit, 28c.; Cleveland, 29c.; Youngstown, 33c.

Ohio has numerous non-integrated mills which have greeted the change with varying opinions. For some, conversion costs are narrowed and marketing territories tightened.

Labor Board Prosecutes Armco for Charges Settled Over a Year Ago

A CLASSIC example of National Labor Relations Board "justice" has been officially called to the attention of the board by the American Rolling Mill Co., Middletown, Ohio, in hearings now in progress at Catlettsburg, Ky.

More than a year ago certain

charges were made against the Ashland, Ky., plant of the company, which, at the suggestion of Philip G. Phillips, regional director of the NLRB, were informally discussed and a settlement was arrived at. This was confirmed in writing by Mr. Phillips on June 16, 1937, in a letter addressed to the company's counsel Robert T. Caldwell, reading as follows:

"I have studied your proposal very carefully and find that the letter, plus the bulletin quoting the section of the act, constitutes satisfactory compliance, and I am, therefore, closing my files in the matter. Let me thank you for your kindness and courtesy."

However, it appears that this did not close the matter. When a complaint was filed on May 31, last, against Armco the charges that presumably had been satisfactorily settled were included. Armco asked that these charges be dismissed but the Labor Board director denied the motion on the ground that no formal complaint had been issued on those charges and no public hearings had been held. Armco counsel, in presenting a plea for dismissal of the charges, said:

"Mr. Phillips, regional director of the ninth region, with headquarters in Cincinnati, on numerous occasions has addressed public audiences in Cincinnati requesting that employers come to him when charges are filed in an endeavor to adjust, compromise and settle the complaints or charges that are made without the necessity of having complaints filed and public hearings on those complaints.

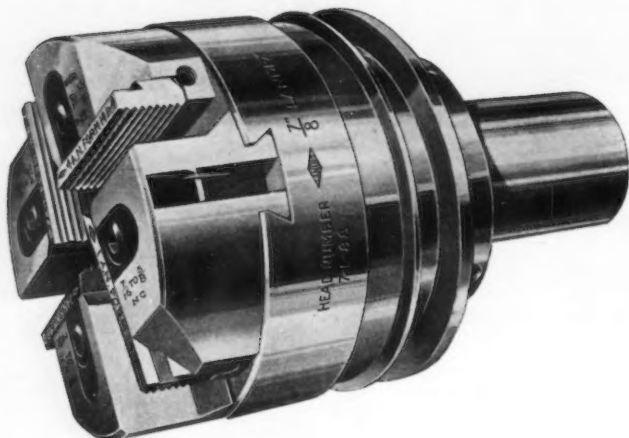
"* * * Certainly when the regional director and the Labor Board enter into a settlement with an employer against whom charges are filed, and the complaining party acquiesces in that settlement, it seems to me it is highly improper and illegal for the board to attempt to reopen those charges. * * * We feel that the complaining party (in this case the Steel Workers Organizing Committee) having acquiesced for more than a year in the settlement and disposition is itself barred from again filing those charges."

Thus the Labor Board is in the position of prosecuting the company for charges that were satisfactorily settled more than a year ago.



Equipment for ALL threading operations

**Raise your Standards of Quality
—use LANDEX type "L" Heads**



Accuracy and Simplicity might well be used to describe the LANDEX Head, but that's not enough.

Faultless in design, hardened throughout and precision ground, accurate to the fraction of a thousandth in size adjustment, the LANDEX Head will show definite improvement in thread quality and production.

The LANDIS Tangential Chaser is a big factor also in reducing tool cost to a mere fraction of former methods.

Write today for Bulletin No. F-80.

**Have you investigated, the
LANDIS Survey Plan?**

LANDIS MACHINE CO., Inc.
WAYNESBORO, PENNA.



Blaw-Knox Awarded New Tin Plate Making Patent

A PATENT has been awarded Blaw-Knox Co., Pittsburgh, on a method of producing tin plate by electroplating. The patent covers heating the strip to a temperature sufficiently high to anneal and temper, gradually cooling the strip while preventing contact with external air, joining portions of the strip to form a continuous strip with good electrical contact at the joint, and moving the strip uninterruptedly through the sequential operations of acid pickling, washing, electroplating in a tin bath and drying.

In the electroplating operation the moving strip constitutes the cathode and passes between anodes distributed along the submerged portion of the strip, thus producing, the patent claims, "steel strip coated with an adherent and evenly distributed electrodeposit of tin."

The patent was issued to the company on the application of John S. Nachtman, who is associated with the Electrochemical Processes division of the Blaw-Knox Co.

Brunner Mfg. Co. Will Not Move from Utica, N. Y.

B RUNNER MFG. CO., Utica, N. Y., states that there is no truth to the rumor mentioned in THE IRON AGE recently that it contemplates removal to Richmond, Ind., or any other place. The item in THE IRON AGE may have given the erroneous impression of a connection between the Brunner Mfg. Co. and the Universal Cooler Corp. but no such connection exists.

Industrial Advertisers To Hear Tom M. Girdler

CLEVELAND.—The program of speakers and clinic topics for the sixteenth annual conference of the National Industrial Advertisers Association, in Hotel Statler, Cleveland, Sept. 21-23, is being completed.

Tom M. Girdler, chairman, Republic Steel Corp., will address the opening session. Other first-day speakers include James H. McGraw, Jr., president, McGraw-Hill Publishing Co., and Frank O. Wyse, Bucyrus-Erie Co., South Milwaukee, president of the association.

Stanley A. Knisely, advertising director of Republic, and vice-president

of the association, heads the committee for conference program and arrangements. Ralph Leavenworth, Fuller & Smith & Ross, Inc., is chairman of the program committee.

G-E and Westinghouse Share \$3,400,000 Order

WESTINGHOUSE ELECTRIC & MFG. Co., East Pittsburgh, Pa., and General Electric Co., Sche-

nectady, N. Y., recently were awarded contracts totaling \$3,400,000 by the Pennsylvania Railroad. The contracts, which cover the construction of electrical equipment for 20 high-speed passenger locomotives for service on the railroad's line between Harrisburg, Washington, and New York, were divided evenly between the two companies. Westinghouse estimates that its share of the contract will require 600,000 man-hours of labor to complete.

HE WANTED IMPROVEMENT



THE inclinator step illustrated is of pressed steel $\frac{1}{8}$ " thick; 15" x 15 $\frac{1}{2}$ " x 3 $\frac{3}{8}$ " high. The welded end lugs provide the necessary strength, at less cost than is feasible by any other method.

This is typical of what Parish engineers are able to accomplish, by a skillful combination of stamping and welding, to provide better parts of improved appearance and lowered final cost.

Whether the stamping be simple or complicated, large or small, complete as it comes from the press or involving building up thru other operations, we welcome the opportunity to discuss the problem with you.

PARISH PRESSED STEEL CO., READING, PA.

Pacific Coast Rep.: F. Somers Peterson Co., 57 California St., San Francisco, Cal.

...OBITUARY...

FRANK F. CORBY, special representative, tubular products sales department, Jones & Laughlin Steel Corp., Pittsburgh, died at his home in Pittsburgh on June 15.

He had been in the steel business since 1896 and with Jones & Laughlin since 1928. He formerly had been connected with National Tube Co., St. Louis; Mark Mfg. Co. of Chicago and

Evanston, and A. M. Byers Co. and Oil Well Supply Co. jointly as special Pacific Coast representative.

♦ ♦ ♦

RULUFF R. STERLING, one of the organizers of the Sterling-Skinner Mfg. Co., of which he was president at his death, was buried July 12 near Detroit. Mr. Sterling, a Detroit manufacturer since 1892, was born April 20, 1854, at Sterling Mills, Canton Center, Mich. His early business life

was spent in Ypsilanti and Escanaba, Mich.

♦ ♦ ♦

WILLIAM TRACY HINCKLEY, a former Detroit and president and general manager of the Swenson Evaporating Division of the Whiting Corp., Harvey, Ill., was buried in Detroit, July 14. Mr. Hinckley was born Jan. 2, 1902. After graduation from University of Michigan in 1926 he was associated with the Ann Arbor Gas Co. for several years. He died in Bogalusa, La., of an injury suffered while diving in a river.

♦ ♦ ♦

JOHN WATSON BOYNTON, one of the founders and director of the Union Twist Drill Co., Athol, Mass., died at his home in Newton, Mass., July 11. Mr. Boynton was born in Trumbull, Conn., in 1862, and was in the twist drill business for 33 years. He was active in literary and scientific pursuits.

♦ ♦ ♦

ARTHUR F. WILSON, assistant production manager, Warner & Swasey Co., Cleveland, died July 13 in a Cleveland hospital. He was 37 years old.

♦ ♦ ♦

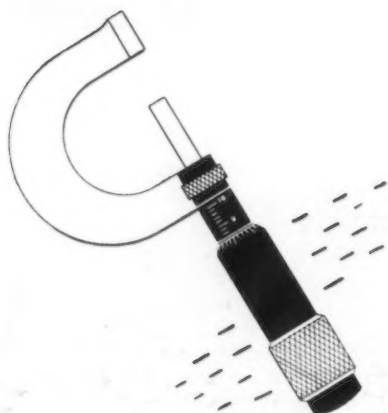
WILLARD H. NASH, superintendent of blast furnaces for the Wickwire-Spencer Steel Co., died in Buffalo on July 5. Previous to 1916 Mr. Nash spent five years in the employ of the American Smelting & Refining Co., New York. In that year he first became connected with Wickwire-Spencer as a construction engineer. He was made superintendent of the wire mill and later held the same position with regard to blast furnace operations. He was 53 years old.

♦ ♦ ♦

RUSSELL B. HURLBURT, assistant export manager of the Pratt & Whitney Co., New York, died at his home in New Rochelle, N. Y., on July 17, after a long illness. He was 51 years old. From 1929 to 1936 he lived abroad as foreign representative of the Pratt & Whitney Co. He was graduated from Cornell University in 1910.

♦ ♦ ♦

HARRY McLEOD LEWIS, one of the founders and secretary-treasurer of the Badger Malleable & Mfg. Co., South Milwaukee, Wis., died on July 7 at Columbia Hospital, Milwaukee, after a short illness. A son, C. McLeod Lewis, is manager of the Badger Malleable & Mfg. Co.



THIS IS NOT A HAMMER

You might be able to set a rivet with this micrometer, but the chances are you couldn't do a very good job. And it would certainly wreck the tool. Tools are specialized—designed to do a specific job well.

Metal cleaners are tools, too. You can't expect good results if you use the wrong one. And today, when metal cleaning operations are more exacting than ever, it's particularly important to use the right one. Rejects don't make money for any one.

We feel that Wyandotte is particularly well equipped to help you with your metal cleaning problems. We have a complete line of cleaners, proved under production-line conditions. And, just as important, our service representatives have practical experience in working out efficient and economical cleaning techniques.

We will be glad to send a representative to discuss your particular cleaning problems.



FABRICATED STEEL

NORTH ATLANTIC STATES

AWARDS

- 360 Tons, New York, General Electric Co. building for World's Fair, to Lehigh Structural Steel Co., Allentown, Pa. A. L. Hartridge Co., New York, general contractor.
- 350 Tons, Concord, N. H., State office building, to Lyons Iron Works, Manchester, N. H.
- 260 Tons, Morris Park, N. Y., rectory and school, Roman Catholic Diocesan Commission, to Lehigh Structural Steel Co., Allentown, Pa.
- 200 Tons, Philadelphia, McCrory Store, to Bethlehem Steel Co.
- 195 Tons, Wilmington, Del., theater building, to Belmont Iron Works, Philadelphia; Consolidated Engineering Co. general contractor.
- 165 Tons, Broome County, N. Y., State highway bridge, to American Bridge Co., Pittsburgh; Lane Construction Corp. general contractor.
- 140 Tons, Newton, Mass., Nurse's Home, to Lehigh Structural Steel Co., Allentown, Pa. Turner Construction Co. is contractor.
- 125 Tons, Cattaraugus County, N. Y., State highway bridge, to Buffalo Structural Steel Co.; C. G. Steuart, Buffalo, general contractor.

THE SOUTH

- 1090 Tons, Nitro, W. Va., new plant for American Viscose Co., to American Bridge Co., Pittsburgh; Hughes-Foulkrod Co., Philadelphia, general contractor.
- 330 Tons, Lake Village, Ark., bridge, to Virginia Bridge Co., Roanoke, Va.
- 236 Tons, Warren County, Ky., bridge, to Midland Structural Steel Co., Cicero, Ill.
- 215 Tons, Lexington, Ky., Picadome School, to George L. Meska & Co., Evansville, Ind.
- 155 Tons, La Grange, Ky., industrial building, to Sneed Architectural Iron Works, Louisville, Ky.
- 120 Tons, Houston, Tex., boiler shelter for Riley Stoker Corp., to Frank M. Weaver & Co., Lansdale, Pa.

CENTRAL STATES

- 750 Tons, Hammond, Ind., warehouse for American Steel Foundries, to two unnamed fabricators.
- 675 Tons, Kansas City, Mo., Big Blue River bridge for Kansas City Terminal Railway Co., to Mount Vernon Bridge Co., Mount Vernon, Ohio.
- 375 Tons, Delaware County, Iowa, bridge, to Clinton Bridge Works, Clinton, Iowa; Snyder & Johnson Co. general contractor.
- 195 Tons, Hammond, Ind., school addition, to Joseph T. Ryerson & Son, Inc., Chicago; James McHugh & Son general contractor.
- 115 Tons, Riton, Wis., Roth subway, project 1436, to Duffin Iron Co., Chicago.
- 115 Tons, Mercer County, Ohio, bridge, to Burger Iron Co., Akron, Ohio.
- 110 Tons, Chicago, new art gallery building, Art Institute of Chicago, to American Bridge Co., Pittsburgh.
- 110 Tons, Woodbury County, Iowa, two bridges, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
- 100 Tons, Cleveland, building at East 14th Street and Huron Road, to Burger Iron works, Akron.
- 415 Tons, Pocatello, Idaho, high school, to Minneapolis-Moline Power Implement Co., Minneapolis.

400 Tons, Burbank, Cal., hangar for Lockheed Aircraft Co., to Consolidated Steel Corp., Los Angeles.

220 Tons, Skyhomish, Wash., Skyhomish River bridge (FAP 189-F), to Pacific Car & Foundry Co., Seattle; Tony Romano, Seattle, general contractor.

156 Tons, Clallam County, Wash., Calawah River bridge (FAP 170-F), to Pittsburgh-Des Moines Steel Co.; Macri Brothers, Seattle, general contractors.

130 Tons, Terrace Heights, Wash., bridges, Yakima Canal, Bureau of Reclamation, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

100 Tons, Phoenix, Ariz., stairways and walkways in Bartlett Dam, Salt River project (Invitation 1050-D), to Reliance Steel Products Co., McKeesport, Pa.

NEW STRUCTURAL STEEL PROJECTS NORTH ATLANTIC STATES

- 3500 Tons, Westchester County, N. Y., contract No. 306, Delaware Aqueduct.
- 2000 Tons, Brooklyn, Brooklyn High School for Home Making, Bethlehem Steel Co., Bethlehem, Pa., low bidder.
- 450 Tons, Washington, Junior High School; bids July 26.
- 450 Tons, Pittsburgh, Whittier public school.
- 370 Tons, Port Richmond, Staten Island, addition to high school, Bethlehem Fabricators, Inc., Bethlehem, Pa., low bidder.
- 355 Tons, New York, World's Fair building, Polish Government.

24 YEARS OF DAILY SERVICE



STERLING PRODUCTS (INCORPORATED)
 1760-80 Fields Ave.
 COLUMBUS, OHIO
 December 28, 1937

The KINNEAR Mfg. Company
 1760-80 Fields Ave.
 COLUMBUS, OHIO

Let KINNEAR Give You the Same Service!

"Kinneare Steel Rolling Doors were installed in our building in 1914 and this is the first time any breakage has occurred. We feel this is quite a record, since they are opened and closed many times a day," says Sterling Products Inc. in this unsolicited letter. And such service records are not unusual for Kinneare Doors! They are durably built of steel, custom made for each doorway and serviced by a nation-wide organization. They are perfectly counterbalanced for effortless motor or manual operation, and are economical to install in any doorway, old or new. Let us figure with you on your door problems.

Offices and Agents in Principal Cities

USE BISCO TUBING

DON'T WASTE

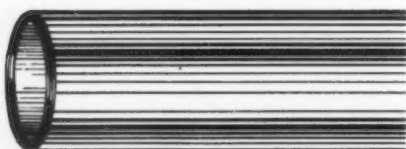
— good steel
— and labor

It's not difficult to make rings and bushings from solid steel—but it is wasteful.

You pay for the steel converted into chips (and the better the steel the more you pay for waste). You also pay for needless labor, power consumption, wear and tear on tools and machinery, and lots of other things. . . .

It's *quicker*, and more economical to use BISCO alloy and Tool Steel Tubing. You can get any diameter up to 14 inches. There are standard sizes for every requirement.

Send for a copy of our stock list showing sizes carried for immediate shipment.



BISCO MAKES

Tubing for Aircraft
For Ball Bearings
For Mechanical Uses
For Boilers (A. S. M. E.)
Tool Steel Tubing
Alloy Tubing
Cold Drawn Tubing
Stainless Steel Tubing

THE BISSETT STEEL COMPANY

945 East 67th St.,
CLEVELAND, OHIO
1036 West Lake St., Chicago, Illinois
367 Main St., Buffalo, N. Y.

ORDER FROM STOCK

- 300 Tons, New York, alterations to elevated structure, 205th Street.
- 250 Tons, New York, land plane hangar administration building, Treasury Department, North Beach Airport.
- 160 Tons, Rehoboth, Del., highway bridge; bids Aug. 9.
- 140 Tons, Ligonier, Pa., R. K. Mellon residence.
- 140 Tons, Jefferson County, Pa., State bridge.
- 125 Tons, Ansonia, Conn., cleaning building and foundry addition, Farrel-Birmingham Co.
- 125 Tons, New Kensington, Pa., building No. 9-B, Aluminum Co. of America.
- 125 Tons, Worthington Valley, Md., Alfred G. Vanderbilt residence.
- 120 Tons, Mount Kisco, N. Y., addition to sewage disposal plant.

THE SOUTH

- 1000 Tons, Houston, Tex., addition to Humble Oil Co. building.
- 225 Tons, Bowling Green, Ky., bridge.
- 205 Tons, Adair, Okla., bridge.
- 175 Tons, Chickamauga Dam, Tenn., substructure, Chickamauga Power House, TVA.

CENTRAL STATES

- 1200 Tons, Detroit, new melt shop and alterations, Rotary Electric Co.
- 1035 Tons, Virginia, Minn., field house.
- 600 Tons, St. Louis, office and shop, American Refrigerator Transit Co.
- 300 Tons, Griswold, Iowa, State bridges, FAP-773.
- 300 Tons, Streator, Ill., warehouse addition for Owens-Illinois Glass Co.
- 275 Tons, Sioux Falls, S. D., bridge; bids July 26.
- 260 Tons, Eveleth, Minn., State bridge No. 5792.
- 255 Tons, Lansing, Mich., State bridge, project B-1 of 23-6-11, C-1.
- 250 Tons, Milwaukee, screen, plant, pockets, Milwaukee Western Fuel Co.
- 150 Tons, Cleveland, addition to Lakewood Hospital; bids Aug. 1.

WESTERN STATES

- 700 Tons, Los Angeles, Southern Pacific bridge.
- 377 Tons, Bremerton, Wash., additional Navy Yard construction; bids opened.
- 330 Tons, Oakland, Cal., railway inspection buildings for San Francisco-Oakland Bay Bridge; bids Aug. 3.
- 200 Tons, Greenville, Cal., overpass and bridge; bids Aug. 3.
- 200 Tons, Estes Park, Colo., two warehouses, Bureau of Reclamation, Green Mountain Dam.
- 150 Tons, Helena, Mont., sinter crushing plant, American Smelting & Refining Co.
- 115 Tons, Walden, Colo., bridge; bids July 27.

FABRICATED PLATES

AWARDS

- 2200 Tons, Chickamauga Dam, Tenn., spillway gates and trash racks, TVA, to Dravo Corp., Pittsburgh.
- 925 Tons, Pittsburgh, Highland Park bridge floor, contract 402-A, to Reliance Steel Products Co., Pittsburgh.
- 220 Tons, Detroit, tanks for Aurora Gasoline Co., to Chicago Bridge & Iron Works, Chicago.
- 140 Tons, Philadelphia, two annealing furnaces for Surface Combustion Corp., to Belmont Iron Works, Philadelphia.
- Unstated tonnage, two welded steel dumpscows for United States Engineer, to Western Pipe & Steel Co., San Francisco, \$199,000.

NEW PROJECTS

- 250 Tons, Louisville, Ky., 25 steel pontoons; bids until Aug. 16 by U. S. Engineers.

SHEET PILING

AWARDS

- 790 Tons, Fairport, Ohio, harbor improvement project, to Bethlehem Steel Co., Bethlehem, Pa.

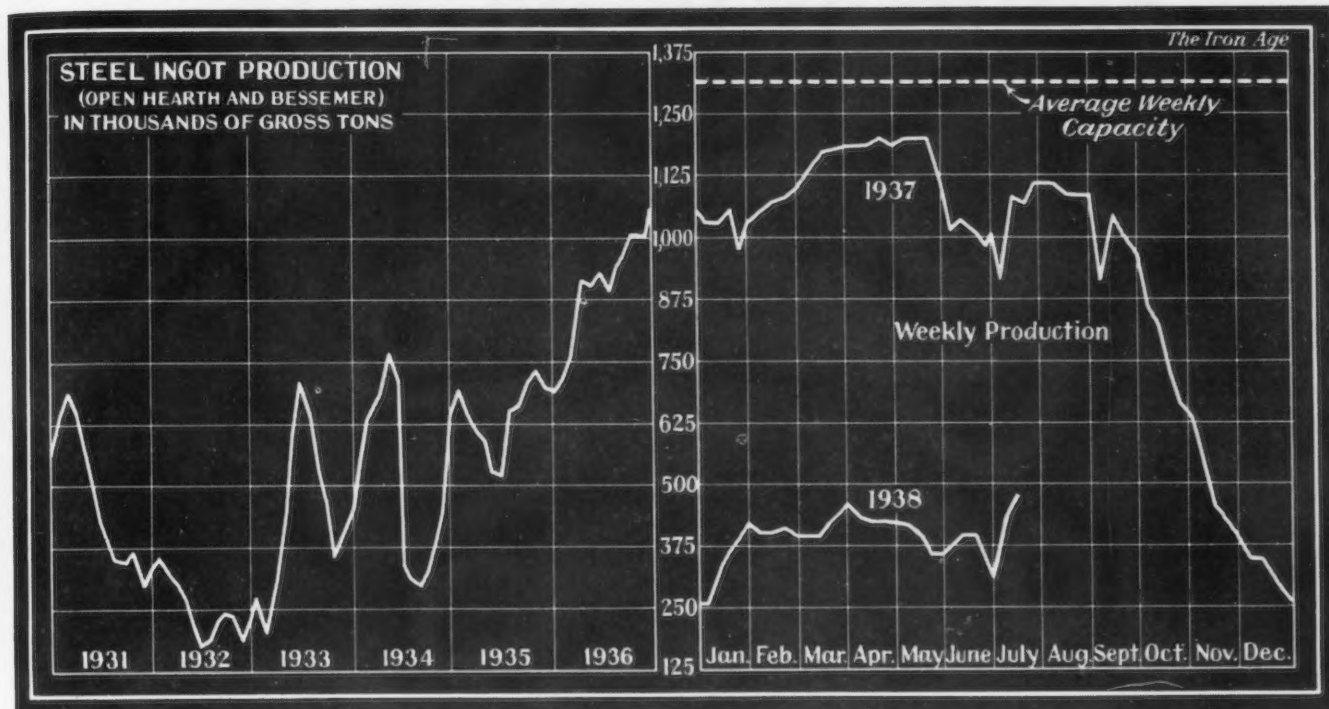
REINFORCING STEEL

. . . Awards of 19,800 tons; 11,800 tons in new projects.

AWARDS

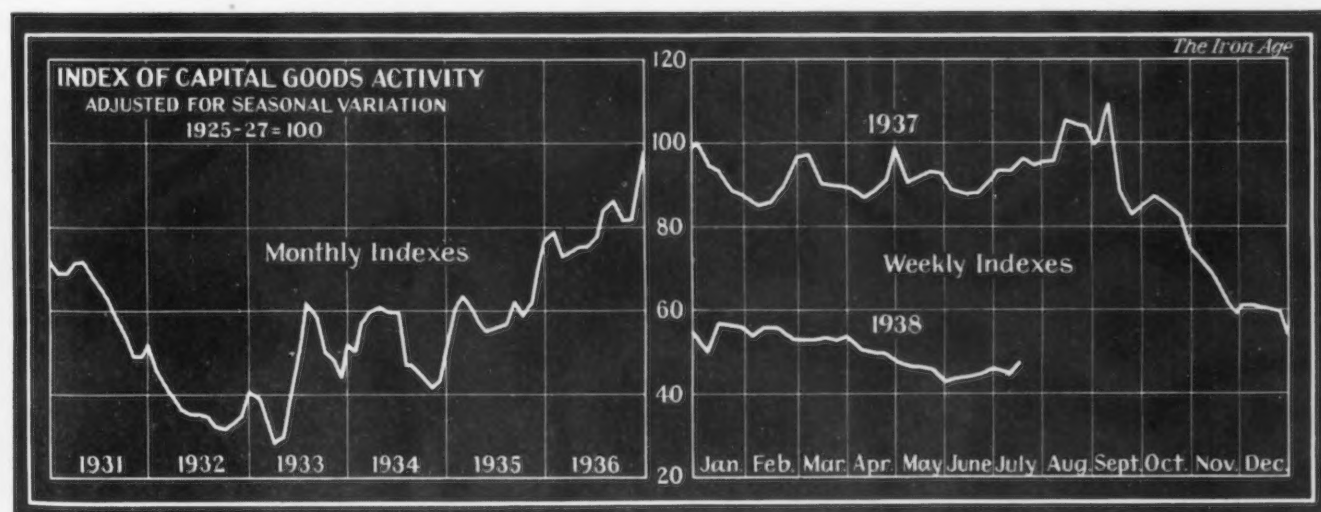
- 9000 Tons, Grand River, Okla., Pensacola Dam, to Sheffield Steel Corp., Kansas City.
 - 4000 Tons, Los Angeles, bids to be taken by U. S. Engineer July 25.
 - 4000 Tons, Odair, Wash., invitation 38090-A, to Bethlehem Steel Co., Bethlehem, Pa.
 - 1500 Tons, Queens, N. Y., Cross Bay Boulevard project, to Carnegie-Illinois Steel Corp., Pittsburgh.
 - 1500 Tons, Brooklyn, covering for Avenue T and Flatbush Avenue, to Igoo Brothers, Newark, N. J. Luang Construction Co., general contractor.
 - 890 Tons, Grand Rapids, Mich., waterworks, to Truscon Steel Co., Youngstown.
 - 325 Tons, Omaha, Neb., Central Nebraska Public Power & Light Co., Jeffrey Section of supply canal, to Bethlehem Steel Co., Bethlehem, Pa.
 - 310 Tons, Chicago, division KK, Southwest sewage plant, to Inland Steel Co., Chicago, through Joseph T. Ryerson & Son, Inc., Chicago.
 - 275 Tons, North Little Rock, Ark., flood wall and drainage structure, to Jones & Laughlin Steel Corp., Pittsburgh, through Arkansas Foundry Co.
 - 250 Tons, Wauwatosa, Wis., Wauwatosa High School, to Inland Steel Co., Chicago, through Joseph T. Ryerson & Son, Inc., Chicago.
 - 250 Tons, Hamden, Conn., State road, to Truscon Steel Co., Youngstown; New Haven Construction Co., New Haven, Conn., contractor.
 - 230 Tons, Tulsa, Okla., bridge, to Sheffield Steel Corp., Kansas City.
 - 209 Tons, Huntington, W. Va., U. S. Engineers (flood wall), to West Virginia Rail Co., Huntington, W. Va.
 - 200 Tons, Hamden, Conn., State road, to Truscon Steel Co., Youngstown; McCallen Road Construction Co., Bristol, Conn., contractor.
 - 175 Tons, Minneapolis, river bank improvement, to Bethlehem Steel Co., Bethlehem, Pa.
 - 166 Tons, Eldridge, Cal., detention cottages at State hospital, to Gunn-Carle & Co., San Francisco; Azevedo Construction Co., general contractor.
 - 150 Tons, Chicago, Ware Bros. factory, to Inland Steel Co. through Joseph T. Ryerson & Son, Inc., Chicago.
 - 150 Tons, Iowa City, Iowa, high school, to Bethlehem Steel Co., Bethlehem, Pa.
 - 115 Tons, Hudson County, N. J., Passaic River bridge, to Bethlehem Steel Co., Bethlehem, Pa.
 - 110 Tons, Chicago, Calumet intercepting sewer, contract 18-B, to Republic Steel Corp., Cleveland, through O. J. Dean, Chicago.
 - 110 Tons, Wooster, Ohio, sewage treatment plant, to Pollak Steel Co., Cincinnati; Holmes Construction Co., Wooster, contractor.
- ### NEW REINFORCING BAR PROJECTS
- 4250 Tons, New York, Delaware Aqueduct, contract No. 306.
 - 1000 Tons, Wappapello, Mo., dam, bids due July 19 to U. S. Engineer's Office, Memphis, Tenn.
 - 450 Tons, Boston, Boston University business administration building.
 - 450 Tons, Los Angeles, bridges; bids to city purchasing agent opened.
 - 350 Tons, New York, subway, section 6A, route 110.

Ingot Production Rises Again to 36 Per Cent



District	Ingots	Production, Per	Cent of Capacity	CURRENT WEEK	PREVIOUS WEEK
Pittsburgh	26.0	24.0	32.5	30.0	23.0
Chicago Valleys	26.0	21.0	54.0	34.0	29.5
Philadelphia	26.0	36.5	29.5	39.5	41.0
Cleveland	61.0	34.0	29.5	38.5	28.5
Wheeling	36.5	29.5	39.5	41.0	30.0
Buffalo	29.5	38.5	28.5	30.0	25.5
Detroit	39.5	28.5	30.0	25.5	50.0
Southern	41.0	30.0	25.5	50.0	32.0
S. Ohio River	30.0	25.5	50.0	32.0	
Western	25.5	50.0	32.0		
St. Louis	50.0	32.0			
East-ern	32.0				
Aggre-gate	36.0				

Capital Goods Output Rebounds After Holiday



THE sharp rebound in ingot production and automobile assemblies during the week following the July 4 holiday week was relatively faster than in previous years and has been sufficient to offset losses in construction contracts and carloadings of lumber products. As a result, THE IRON AGE index of capital goods activity has climbed 3.7 points from a revised index of 44.6 to 48.3. The ingot rate rose 9 points from 23 to 32 per cent of capacity; automobile production gained 7001 units over the preceding week, but carloadings of forest products fell a like amount, 6852, even making allowances for the holiday week, for which current figures for this factor are taken.

	Week Ended July 16	Week Ended July 9	Comparable Week	
			1937	1929
Steel ingot production ¹	45.8	33.5	120.5	141.4
Automobile production ²	42.5	29.3	116.2	127.2
Construction contracts ³	59.6	62.2	72.7	121.4
Forest products carloadings ⁴	47.5	51.7	74.6	125.0
Production and shipments, Pittsburgh District ⁵	46.2	46.4*	104.5	131.0
Combined index	48.3	44.6*	97.7	129.2

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. Engineering News-Record; 4. Association of American Railroads; 5. University of Pittsburgh. *Revised.

...SUMMARY OF THE WEEK...

... Ingot production up four points to 36 per cent; buying improves.

o o o

... Wage question dominant issue in determining market's future course.

o o o

... Steel scrap higher at nearly all centers except Pittsburgh.

STEEL ingot production has risen four points to 36 per cent of the country's capacity, the largest increase within one week since March, 1936, excepting post-holiday periods, and the highest rate thus far in 1938.

In some districts the betterment in operations far exceeds the average. In the Cleveland-Lorain area, for example, the rate is up 13 points to 34 per cent; the Southern Ohio district is 12½ points higher at 41 per cent; the Wheeling-Weirton area has gained seven points to 61 per cent; Chicago output, at 34 per cent, is up two points; Pittsburgh has also gained two points to 26 per cent; the Youngstown district is three points higher at 33 per cent, while Eastern Pennsylvania has advanced three points and Buffalo two and a half points.

With automotive buying for new models still largely in the future, railroad buying still at a minimum and likely to continue so at least until the matter of wage reductions has been settled, farm machinery plants preparing for summer shutdowns of two or three weeks and building construction activity not yet receiving the full impetus of Government spending and lending, the improvement in steel buying that has occurred is traced largely to miscellaneous sources.

Steel buyers for the most part are still cautious, their purchases being forced by depletion of inventories. They are not being stampeded by intimations that partial restoration of price cuts must come if wages are not reduced.

WITH the meeting in Washington this week of leading steel company executives, called by the Government, the wage question is the dominant issue in the future determination of the course of steel markets and the matter of profits or losses for steel producers.

If wages are to be reduced, which some in the industry now believe to be unlikely in view of

Government opposition, the only recourse is higher prices as it would require a steep gain in operations to offset present high costs. It is estimated that a 10 per cent wage cut would not nearly cover the reduced net yield of \$5 to \$7 a ton which most companies will sustain because of lower prices and basing point changes.

Based on an average hourly rate of about 82c. for the first five months of this year, a 10 per cent wage reduction would bring a theoretical saving of \$3.28 per ton of finished steel if 40 man-hours of labor per ton is used. However, some mills estimate as low as \$2 a ton, calculations being complicated by the greater amount of labor required per ton when operations are reduced. The United States Bureau of Labor Statistics estimates 46.48 man-hours when operations are between 20 and 25 per cent, ranging down to 34.43 man-hours at 55 to 60 per cent. Second quarter earnings statements, to be issued next week, will give some indication of how the industry may fare in this quarter under the new set-up.

A complication which arises under the present situation is the number of construction projects on which figures are being taken or soon will be. It is customary for steel mills to protect contractors for the life of the job, but some mills are loath to load up too heavily with such business in view of the probability that much of it may mean a loss.

RISING scrap prices will add to steel-making costs, although mills have not yet bought heavily. Advancing quotations are partly due to bullishness among scrap brokers and the fact that good scrap is scarce as many yard inventories are being withheld from sale in the hope of higher prices. Activity in scrap has subsided temporarily at Pittsburgh, where No. 1 heavy melting scrap is unchanged, but this grade has gone up 50c. a ton at Chicago, Philadelphia, Cleveland and Buffalo. Cast grades and specialties are \$1 higher in some markets. THE IRON AGE scrap composite price has risen to \$13.42.

STEEL bookings are gaining with many producers, but do not in all cases exceed those of the comparable period in June. Although structural steel awards of 7800 tons for the week are lighter than usual, reinforcing bar lettings totaled 20,000 tons, including 9000 tons for a dam in Oklahoma and 4000 tons for a bridge at Odair, Wash. New structural inquiries total 16,000 tons and those for reinforcing bars are nearly 12,000 tons.

A little life has been injected into the railroad equipment market. The Seaboard Air Line will buy nine diesel locomotives and the Wheeling & Lake Erie contemplates the purchase of five freight engines. The Pennsylvania has awarded electrical equipment for 20 locomotives.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	July 19, 1938	July 12, 1938	June 21, 1938	July 20, 1937
Rails, heavy, at mill.....	\$42.50	\$42.50	\$42.50	\$42.50
Light rails, Pittsburgh.....	43.00	43.00	43.00	43.00
Rerolling billets, Pittsburgh...	34.00	34.00	37.00	37.00
Sheets bars, Pittsburgh.....	34.00	34.00	37.00	37.00
Slabs, Pittsburgh.....	34.00	34.00	37.00	37.00
Forging billets, Pittsburgh...	40.00	40.00	43.00	43.00
Wire rods, Nos. 4 and 5, P'gh.	43.00	43.00	47.00	47.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.90	1.90	2.10	2.10

Pig Iron

Per Gross Ton:	July 19, 1938	July 12, 1938	June 21, 1938	July 20, 1937
No. 2 fdy., Philadelphia.....	\$21.84	\$21.84	\$25.84	\$25.76
No. 2, Valley furnace.....	20.00	20.00	24.00	24.00
No. 2, Southern Cin'ti.....	20.06	20.06	23.89	23.69
No. 2, Birmingham.....	16.00	16.00	20.38	20.38
No. 2, foundry, Chicago*.....	20.00	20.00	24.00	24.00
Basic, del'd eastern Pa.....	21.34	21.34	25.34	25.26
Basic, Valley furnace.....	19.50	19.50	23.50	23.50
Malleable, Chicago*.....	20.00	20.00	24.00	24.00
Malleable, Valley.....	20.00	20.00	24.00	24.00
L. S. charcoal, Chicago.....	28.34	28.34	30.34	30.04
Ferromanganese, seab'd, car-				
lots.....	92.50	92.50	102.50	102.50

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.25	2.25	2.45	2.45
Bars, Chicago.....	2.25	2.25	2.50	2.50
Bars, Cleveland.....	2.25	2.25	2.50	2.50
Bars, New York.....	2.59	2.59	2.81	2.78
Plates, Pittsburgh.....	2.10	2.10	2.25	2.25
Plates, Chicago.....	2.10	2.10	2.30	2.30
Plates, New York.....	2.29	2.29	2.55	2.53
Structural shapes, Pittsburgh	2.10	2.10	2.25	2.25
Structural shapes, Chicago ..	2.10	2.10	2.30	2.30
Structural shapes, New York	2.27	2.27	2.52	2.5025
Cold-finished bars, Pittsburgh	2.70	2.70	2.90	2.90
Hot-rolled strips, Pittsburgh	2.15	2.15	2.30	2.40
Cold-rolled strips, Pittsburgh	2.95	2.95	3.10	3.20
Sheets, galv., No. 24, P'gh...	3.50	3.50	3.65	3.80
Sheets, galv., No. 24, Gary...	3.50	3.50	3.75	3.90
Hot-rolled sheets, Pittsburgh	2.15	2.15	2.30	....
Hot-rolled sheets, Gary.....	2.15	2.15	2.40	....
Cold-rolled sheets, Pittsburgh	3.20	3.20	3.35	....
Cold-rolled sheets, Gary.....	3.20	3.20	3.45	....
Wire nails, Pittsburgh.....	2.45	2.45	2.75	2.75
Wire nails, Chicago dist. mill	2.45	2.45	2.80	2.80
Plain wire, Pittsburgh.....	2.60	2.60	2.90	2.90
Plain wire, Chicago dist. mill	2.60	2.60	2.95	2.95
Barbed wire, galv., P'gh....	3.20	3.20	3.40	3.40
Barbed wire, galv., Chicago				
dist. mill.....	3.20	3.20	3.45	3.45
Tin plate, 100-lb. box, P'gh...	\$5.35	\$5.35	\$5.35	\$5.35

*Corrected.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh...	\$14.25	\$14.25	\$11.50	\$20.00
Heavy melting steel, Phila...	13.75	13.25	12.25	19.25
Heavy melting steel, Ch'go...	12.25	11.75	10.25	18.25
Carwheels, Chicago.....	13.75	13.00	12.00	19.25
Carwheels, Philadelphia.....	15.75	14.75	14.75	19.75
No. 1 cast, Pittsburgh.....	14.75	14.75	13.25	19.25
No. 1 cast, Philadelphia.....	15.75	15.75	14.25	20.25
No. 1 cast, Ch'go (net ton)...	12.25	11.75	10.25	15.75
No. 1 RR. wrot., Phila.....	15.25	15.25	15.25	19.75
No. 1 RR. wrot., Ch'go (net)	10.50	9.75	7.75	16.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$3.75	\$3.75	\$3.75	\$4.35
Foundry coke, prompt.....	4.75	4.75	4.75	5.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	9.75	9.75	9.00	14.00
Lake copper, New York.....	9.875	9.875	9.125	14.12 1/2
Tin (Straits), New York.....	43.35	43.625	38.70	60.00
Zinc, East St. Louis.....	4.75	4.75	4.00	7.00
Zinc, New York.....	5.14	5.14	4.39	7.35
Lead, St. Louis.....	4.75	4.75	3.85	5.85
Lead, New York.....	4.90	4.90	4.00	6.00
Antimony (Asiatic), N. Y....	14.00	14.00	14.00	14.75

The Iron Age Composite Prices

Finished Steel

July 19, 1938	2.300c. a Lb.
One week ago	2.300c.
One month ago	2.487c.
One year ago	2.512c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low	
1938.....	2.512c., May 17	2.300c., July 6	
1937.....	2.512c., Mar. 9	2.249c., Jan. 4	
1936.....	2.249c., Dec. 28	2.016c., Mar. 10	
1935.....	2.062c., Oct. 1	2.056c., Jan. 8	
1934.....	2.118c., Apr. 24	1.945c., Jan. 2	
1933.....	1.953c., Oct. 3	1.792c., May 2	
1932.....	1.915c., Sept. 6	1.870c., Mar. 15	
1931.....	1.981c., Jan. 13	1.883c., Dec. 29	
1930.....	2.192c., Jan. 7	1.962c., Dec. 9	
1929.....	2.223c., Apr. 2	2.192c., Oct. 29	
1928.....	2.192c., Dec. 11	2.142c., July 10	
1927.....	2.402c., Jan. 4	2.212c., Nov. 1	

Pig Iron

\$19.61 a Gross Ton
19.61
23.25
23.25

Based on average basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low	
23.25, June 21	\$19.61, July 6		
23.25, Mar. 9	20.25, Feb. 16		
19.73, Nov. 24	18.73, Aug. 11		
18.84, Nov. 5	17.83, May 14		
17.90, May 1	16.90, Jan. 27		
16.90, Dec. 5	13.56, Jan. 3		
14.81, Jan. 5	13.56, Dec. 6		
15.90, Jan. 6	14.79, Dec. 15		
18.21, Jan. 7	15.90, Dec. 16		
18.71, May 14	18.21, Dec. 17		
18.59, Nov. 27	17.04, July 24		
19.71, Jan. 4	17.54, Nov. 1		

Steel Scrap

\$13.42 a Gross Ton
13.08
11.33
19.17

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	
\$14.00, Jan. 4	\$11.00, June 7		
21.92, Mar. 30	12.92, Nov. 16		
17.75, Dec. 21	12.67, June 9		
13.42, Dec. 10	10.33, Apr. 23		
13.00, Mar. 13	9.50, Sept. 25		
12.25, Aug. 8	6.75, Jan. 3		
8.50, Jan. 12	6.43, July 5		
11.33, Jan. 6	8.50, Dec. 29		
15.00, Feb. 18	11.25, Dec. 9		
17.58, Jan. 29	14.08, Dec. 3		
16.50, Dec. 31	13.08, July 2		
15.25, Jan. 17	13.08, Nov. 22		

...PITTSBURGH...

New business shows encouraging gain, and Pittsburgh ingot rate moves up two points . . . Steel wages the dominating topic of market conversation.

PITTSBURGH, July 19.—New business in the past week, the first full week since the Independence Day holiday, showed an encouraging gain in most lines. The cumulative total of orders in the first two weeks of the current month is running, on a daily basis, about 10 per cent ahead of the like number of days in June, with the largest gains being registered in the sheet and cold finished bar departments. The improvement may be credited in a large measure to a release of orders that had been held up for several weeks prior to the formal price cuts.

Wages are the dominating topic of conversation in steel circles, and, despite the flood of rumors crediting independent producers with inaugurating wage reductions, no such move has yet been taken.

Production of ingots in this district is estimated at 26 per cent for the present week, a rise of two points or 8 per cent over the past week. This rate compares with 23 per cent in the week preceding the holiday. The Wheeling-Weirton rate is 61 per cent.

Quotations on No. 1 heavy melting steel remain unchanged at \$14 to \$14.50.

Pig Iron

There has been a slight gain in shipments over the past two weeks but new orders continue to be limited to such small lots as are necessary for immediate operations. Melting activities in this district have shown no improvement.

Semi-Finished Steel

The trend of incoming business is mildly upward, with the total for the present month to date being about 10 per cent ahead of the comparable period in June. Replenishment of stocks following the inventory period has accounted for a large part of the gain.

Bars, Plates and Shapes

A few automotive clean-up orders, together with some stocking by jobbers, have resulted in slightly better

hot-rolled bar bookings in the past week. Following the settlement of the financial details of the recent purchase of 5550 freight cars by the Southern Railway, orders are beginning to seep in to local mills. Structural inquiries and awards in the past week were more numerous than for some time past. Particularly noteworthy was the awarding of 2200 tons to the Dravo Corp. for spillway gates for the Chickamauga Dam, and 925 tons for a bridge floor in Pittsburgh awarded to Reliance Steel Products Co.

Cold Finished Bars

Orders in the past week showed an encouraging increase over the past several weeks, and raised the cumulative volume of the present month to date substantially above the volume of the similar period in June. Automobile parts suppliers were active last week covering for material for the 1939 models.

Reinforcing Bars

Both awards and inquiries have shown a substantial increase in the past week. A heavy share of this week's awards represents releases of material that had been held up pending settlement of the price situation. The week's heaviest award was 9000 tons for the Pensacola Dam in Oklahoma to be supplied by the Sheffield Steel Corp. The largest inquiry pending is for 4250 tons for a section of the Delaware Aqueduct, New York.

Tubular Goods

Oil-country goods buying has shown a further decrease, as activity in the oil field slackens.

Sheets and Strip

The improvement in demand from miscellaneous sources, noted a week ago, has been extended, with the result that sales in the present month so far have shown a considerable improvement over the similar period in June. A few small sheet tonnages for 1939 model automobiles, placed in the

past week, have helped to swell the month's total.

Tin Plate

Operations this week are up slightly to 37 per cent against a shade under 35 per cent in preceding week. Specifications have been a little heavier lately and augur a continuation of at least the present rate of operations for the next few weeks.

..CAST IRON PIPE..

Fitchburg, Mass., has awarded 100 tons of 12-in. pipe to Warren Foundry & Pipe Corp., Boston.

York, Me., has been awarded a PWA cash allotment for a water system to cost approximately \$114,545.

Lynn, Mass., has awarded about 100 tons of 6-in. pipe to Warren Foundry & Pipe Corp., Boston.

Hartford, Conn., has awarded 300 tons of 6 to 16-in. pipe to Florence Pipe Foundry & Machine Co., Philadelphia.

Asheboro, N. C., plans pipe line extensions in water system; also elevated steel tank and tower and filtration plant. Cost about \$200,000. Election has been called on Aug. 2 to approve bond issue in that amount. William M. Piatt, Depositors National Bank Building, Durham, N. C., is consulting engineer.

Wagoner, Okla., plans pipe lines for water system and other waterworks installation. Cost about \$55,000. Financing in part has been arranged through Federal aid. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Eldorado, Tex., will take bids early in August for pipe for water system, including 6 and 8-in. for main lines, deep-well pumping machinery and other waterworks installation. Cost about \$65,000. Financing has been arranged through Federal aid.

Newport Beach, Cal., plans pipe line extensions in water system. Cost about \$140,000. Special election will be held soon to vote bonds for \$250,000 for this and other municipal improvements.

Bremerton, Wash., plans 24-in. for main line from Gorst Creek water pumping station to city, replacing an existing 16-in. line. Cost about \$125,000. Financing is being arranged through Federal aid.

Pittsville, Wis., will take bids soon for pipe for water system; also for elevated steel tank and tower, pumping machinery, etc. Cost about \$55,000. Financing is being arranged through Federal aid. A. Lawrie Kurtz, 739 North Broadway, Milwaukee, is consulting engineer.

Helena, Mont., plans pipe line extensions and replacements in water system, including 10-in. for main lines. Cost about \$55,315. Financing is being arranged through Federal aid. Oscar A. Baarson is city engineer.

Decherd, Tenn., plans pipe lines for water system and other waterworks installation. Fund of \$107,000 has been secured through Federal aid for this and sewerage system. Freeland, Roberts & Co., Third National Bank Building, Nashville, Tenn., are consulting engineers.

Sarasota, Fla., plans pipe lines for water system; also elevated steel tank and tower, pumping machinery and other waterworks installation. Cost about \$138,000. Financing has been arranged through Federal aid. C. K. Dodd is city engineer.

Nortonville, Kan., plans pipe lines for water system; also elevated steel tank and tower. Cost about \$45,000. Financing is being arranged through Federal aid. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Belle Center, Ohio, will take bids July 29 on 200 tons of 4, 6 and 8-in. pipe.

.... CHICAGO

Mills at 34 ingot producing rate, highest since last November . . . Southern Railway car tonnage aids operations . . . Implement plants to shut down for two weeks . . . Wages must be cut or prices increased, steel producers say.

CHICAGO, July 19. — The highest rate since last May, 34 per cent of capacity, a gain of one and one-half points over last week, has been achieved by local mills during the current seven-day period.

Of outstanding importance to Chicago mills and a factor in the better operations this week and probably the next few weeks also, is the fact that about 50 per cent of the Southern Railway's steel needs, or 35,000 tons, will find its way into this district. Slated for immediate rolling, this business should call for the lighting of additional open hearths in several local plants.

With railroads generally out of the market, and farm implement and motor car plants far from busy, miscellaneous buying is credited with the sustained and improved operating schedules. Of all the plants of International Harvester Co., only the East Moline, Ill., factory will be unaffected by a summer shutdown, although employment has been curtailed. The Harvester motor truck operations at Fort Wayne, Ind., and Springfield, Ohio, will be closed the first two weeks in August, by which time some of the farm implement and tractor plants, now down, should be in operation again.

District mills are becoming clarified on the situation caused by elimination of basing point differentials and addition of new base cities. It is now plain that some former markets for sellers here may be better served from other steel centers and, likewise, that new customers will come to this area who previously bought their requirements elsewhere. That this realignment of customers will be important is certain. It also is evident that all mills will be more closely restricted to their own natural territories than ever before.

Unless producers succeed in reaching and maintaining operating levels of 60 per cent and more, they insist that either wages must be reduced or prices increased, in spite of Federal objections to both alternatives.

Pig Iron

Buying for third quarter contracts is still a prominent feature of the current market. Shipments are up only slightly, however, and orders against these tonnages probably will not be seen in volume until early fall.

Structural Shapes and Reinforcing Steel

Construction activity, though much improved, still is relatively unimpressive. Federal and state projects are increasing, but no rise in private building is seen. Reinforcing bar prices are said to be stronger.

Plates, Sheets and Strip

About half of the Southern Railway's steel requirements of 70,000 tons is expected to come into this district and some mills already are beginning to benefit. Other than this program, little railroad tonnage of consequence is anticipated or is even in sight. As 1939 motor cars are not yet in production, demand for flat rolled products remains moderate.

Bars

With both the automobile and farm equipment makers showing little activity, bar mills are receiving few orders. Local implement plants will not return to full production until next month.

Wire and Wire Products

Merchant trade products continue the leaders in the wire line in this district. Rural interest is being maintained far longer than usual and sellers are glad of the opportunity to offset even partially the poorness of demand from the manufacturing trade. Resumption of motor car buying is expected to remedy this latter condition late in August or early in September.

Girdler "Not Raising Apples," Republic Tells La Follette

WASHINGTON.—The Senate Civil Liberties Committee this week summoned Republic Steel Corp. officials in a case built partly around a 1934 statement attributed to Tom M. Girdler, Republic board chairman, that he would first "retire and grow apples" before dealing with CIO chairman John L. Lewis.

Charles M. White, of Cleveland, Republic vice-president in charge of operations, told Senator La Follette, committee chairman, that "Mr. Girdler is still not raising apples," and proceeded to reconcile the Girdler statement with an outline of the corporation's long-established labor policy. Republic will meet and bargain with any group of employees on wages, hours and working conditions, Mr. White said.

Against "Blackjacking"

Mr. La Follette, who said he couldn't "quite square that policy with Mr. Girdler's statement," was told that there was "all kinds of concrete evidence" that the company's workers did not want the CIO in its initial organi-

zation drive back in 1934. A professional union of the CIO variety, Mr. White testified, would mean bringing into the plant the "closed shop" and all its concomitant evils, and recognition of a group whose representatives are not elected but rather appointed. He added that his company believes in bargaining collectively both in theory and in practice but not in dealing with any "blackjacking" unions.

Railroad Wage Cut Conference Being Held

CHICAGO.—Firm stands were taken by both parties in the conference proceedings under way here between representatives of Class 1 railroads and the Brotherhood of Railroad Trainmen on the subject of a 15 per cent wage cut for rail workers.

The managements' representative at the voluntary conference said no alternative to the 15 per cent demand was being proposed.

....ST. LOUIS....

... Lower steel prices fail to stimulate buying.

ST. LOUIS, July 19. — The new schedule of the Granite City Steel Co. on sheets, which cut the differential over Gary from 20c. to 10c. per 100 lb. was met competitively by Chicago and Eastern steel mills. This has not accelerated the placing of orders for heavy tonnages. Buying is still on a conservative basis. However, the underlying feeling is better.

The United States Engineer's office at Memphis, Tenn., will open bids July 19 for a dam at Wappapello, Mo., requiring 1000 tons of reinforcing bars. Only a small tonnage of structural shapes and steel sheet piling will be used.

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BIRMINGHAM

... New life in steel market ... Republic Steel starts new 150-ton open hearth ... Pig iron buying substantial.

BIRMINGHAM, July 19. — Republic Steel Corp. placed one of its two new 150-ton open hearths at Gadsden in operation at the beginning of the week. The other is just about finished and can be made ready for production on short notice. This now gives Republic Steel seven serviceable open-hearth units at Gadsden; there will be eight when the other is completed. These are the first additions to the district's steel making

capacity in more than 10 years, other than the rebuilding and enlargement of several existing furnaces.

Republic Steel is operating five open hearth units this week, as compared with four for last week and the past two months. The district's total for the week is 11, an increase of one. Tennessee Coal, Iron & Railroad Co. continues with six, four being at Fairfield and two at Ensley.

There are signs of new life and

better feeling in the steel market. Consumers have begun rebuilding their stocks in a moderate way. A fair volume of new tonnage is being developed in light products.

The outlook for structural shapes, bars and plates is the best in a long time. Some good tonnage is in immediate prospect for bridges, barges, tanks and freight cars. Virginia Bridge will need 3500 tons for the Tennessee River bridge in North Alabama; Bessemer plant of the Pullman-Standard Car Mfg. Co., around 17,000 tons for the 2000 freight cars to be built for the Southern Railway; Tampa Shipbuilding & Engineering Co., a substantial tonnage for four boats.

The pig iron market has also blossomed, and a large book tonnage has accumulated. This is steadily growing. Foundries are buying freely for the first time in a year. Shipments have improved somewhat but melters are not stocking too fast, and their current melt has not yet increased to any marked extent.

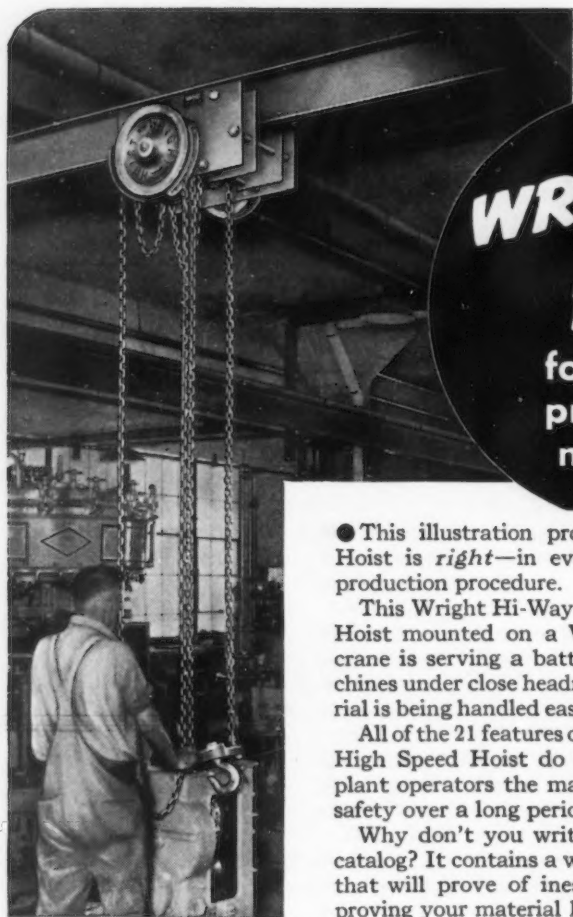
Republic Steel is adding a department at Gadsden for manufacturing bolts and nuts. Equipment has arrived for installation. Production will begin in about two months. This department will require about 75 men at the outset. It has been stated that other new finished products will follow.

Production at the new Fairfield tin plate mill has been decreased a little to conform to current requirements.

About 150 employees of the Vulcan Rivet & Bolt Corp. "took a vacation" last week, following the posting of a 10 per cent wage cut.

Construction of a \$250,000 plant at Mobile by the American Cyanamid Co. is expected to start shortly.

Gulfport Creosoting Co., Gulfport, Miss., has announced it will establish a plant at Mobile.



● This illustration proves that the Wright Hoist is *right*—in every way—for routine production procedure.

This Wright Hi-Way Improved High Speed Hoist mounted on a Wright hand traveling crane is serving a battery of production machines under close headroom conditions. Material is being handled easily, quickly and safely.

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Why don't you write for the new Wright catalog? It contains a world of statistical data that will prove of inestimable value in improving your material handling methods.

**WRIGHT MANUFACTURING DIVISION
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YORK, PENNSYLVANIA

In Business for Your Safety



WRIGHT *Improved High Speed* **HOISTS**

IN the article in THE IRON AGE of July 14, entitled "Multiple Tool Machining of Truck Wheels," a typographical error appeared on page 32. This was in connection with the reference to Fig. 3 which stated that "one man operates two Beckert milling machines using five inch milling cutters." This should have read "Becker" milling machines, the manufacture of which has been continued by the Reed-Prentice Corp. of Worcester, Mass., since the purchase of the Becker Milling Machine Co. in 1922.

.. PHILADELPHIA ..

Operations in eastern Pennsylvania up three points to 26 per cent . . . Steel buying slightly better, with automobile releases most conspicuous . . . Many mills look on current price-basing point-wage situation as hopeless . . . Scrap rides further upward on broker bullishness.

PHILADELPHIA, July 19.—Steel makers here still are skeptical of the soundness of the current fillip in steel production, conventional optimism in a rising stock market being countered by firm unbelief in the economy of the current price-basing point-wage relationship. That this relationship will have to be altered is generally considered imperative if any producer is to show black figures in the latter part of the year, and as long as the relationship is unaltered it will progressively tend to demonstrate that too much tinkering with the basing point system can wreck havoc with small producing units, and that there is a limit to which prices can be knocked down and wages kept up in a capitalistic economy.

Although all mills have pretty well clarified their pricing mechanism, there has been little or no improvement in incoming orders. Miscellaneous business can perhaps be called a shade better, whereas among the large buyers the local autobody stamping plants occupy the spotlight by their recent sizable purchases for 1939 units. Shipbuilders are sending through regular releases, but the building construction field is experiencing unseasonal lethargy and the railroads still show no buying inclination even though they are considered badly in need of track replacement tonnage and car reconstruction and repair steel.

Tin plate seems to be moving in slightly better volume but still not in sufficient quantity to create much enthusiasm. Even though a 25c. per base box concession is bruited, some sellers insist the published price will be maintained until the fall. Plate sellers are receiving scattered foreign inquiry most of which is under 1.85c. a lb., f.a.s., a price hardly considered attractive enough by most mills to warrant any effort to press for orders.

Lukens has four furnaces on, Worth has three operating (one overlapping), Alan Wood is operating two, and Bethlehem is on a slightly improved schedule, the net result being an aggregate three-point pick-up in the dis-

trict operating rate to a 26 per cent level.

Whereas pig iron consumers have experienced no material acceleration in activity, they are none the less rather convinced that today's published price will undergo no additional downward revision, particularly with scrap showing sharp advances, and for these reasons are more inclined to come in for slightly better commitments. But still the outlook for sellers is not promising enough to bring forth any plans on the part of merchant producers to blow in stacks over the remainder of the summer.

Bolstered by rises in steel produc-

....PIPE LINES....

Standard Oil Co. of Louisiana, St. Charles Avenue, New Orleans, plans new 8-in. welded steel pipe line from point near Magnolia, Ark., to main pipe line at Haynesville, La., about 20 miles, for crude oil transmission; also a 4-in. steel pipe line gathering system between Magnolia, Buckner and Village oil field districts, all in Columbia County, Ark., connecting with new 8-in. line from Magnolia. Pumping stations will be installed for booster service.

Breaux Bridge, La., asks bids until July 28 for steel pipe line system for natural gas distribution, including operating facilities, meters, regulators, main pipe line connections, etc. F. P. Joseph, Glenmora, La., is consulting engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until July 29 for 38,000 lin. ft. of galvanized welded steel pipe, and for 200 lin. ft. of welded steel pipe (Schedule 3369).

Department of Water and Power, Los Angeles, D. P. Nicklin, purchasing agent, will take bids soon for several units of Los Angeles aqueduct and distribution system, for which financing in amount of \$5,500,000 is being arranged through Federal aid. Steel pipe will be required for four units or sections of construction as follows: 66,000 lin. ft. of 54 and 60-in. (Unit No. 1), 16,300 lin. ft. of 36, 42 and 68-in. (Unit No. 3), 58,200 lin. ft. of 24, 30 and 51-in. (Unit No. 4), 3240 ft. of 40-in. x 3/16-in. welded steel pipe, and 510 lin. ft. of 40-in. x 1/4-in. welded steel pipe, for main conduit (Unit No. 6); also for replacement of 1/4-in. and 5/16-in. plate steel pipe on Los Angeles aqueduct siphons with 3/8-in. plate steel pipe, 28,975 ft. in all, or (alternate) line present steel pipe with 6-in. reinforced concrete (Unit No. 10).

Lloyd D. Burton, Chanute, Kan., operating natural gas properties in Hugoton, Kan., gas field, and group of associated independent operators in same district, plan new welded

tion, better feeling among some steel producers and broker-dealer bullishness, scrap's upward swing has still not reached its zenith. Heavy steel grades and cast grades all have been marked up 50c. Further advances in the near future are indicated by the general undertone of the current market.

The week's only local shapes award involved 200 tons for a McCrory store building, which went to Bethlehem Steel Co. The 4500 tons in the Pennsylvania Avenue bridge, Washington, is still hanging fire, other active tonnages being 160 tons for a Rehoboth, Del., bridge and 450 tons for a Washington Junior High School.

Imports

The following iron and steel imports were received here during the past week: 80 tons of steel shapes, 3 tons of steel bars, 10 tons of steel angles, 10 tons of steel bands and 34 tons of steel channels from Belgium; 3002 tons of chrome ore from Africa; 40 tons of steel angles and 4 tons of steel bars from France; 9 tons of steel bars, 32 tons of steel tubes, 20 tons of steel forgings from Sweden.

steel pipe lines for complete gathering system in Hugoton field, which includes extensive acreage in parts of eight neighboring counties, with daily potential output of about 1,000,000 cu. ft. from approximately 200 operating wells; also main welded steel pipe lines from terminal stations to marketing centers, including connections with existing main gas transmission lines. Entire project will total about 550 miles of pipe lines, to cost close to \$10,000,000. Application has been made to Kansas State Corporation Commission for permission, and hearing is scheduled July 21. Arrangements for financing are being made.

....BUFFALO....

... Steel buying slightly more active . . . Operations higher.

BUFFALO, July 19.—The principal sign of greater activity in this area is the addition of one open-hearth by Bethlehem Steel Co.'s Lackawanna plant. This increase brings the number of furnaces in operation there to 12, while Republic Steel Corp. has two on and Wickwire-Spencer, one. All lines have become slightly more active.

No new jobs of sizable tonnage have come up this week but every architect in the district is said to have from two to 15 projects going on the boards. These will run from \$300 to \$2,000,000. There are about 75 WPA projects in the area, one-third of which are looked for before Sept. 1.

....NEW YORK....

Steel sales gain moderately . . . Consumers still cautious pending settlement of steel wage question . . . Higher prices may come if wage remains intact.

NEW YORK, July 19.—A moderate gain in orders has been experienced by steel sellers here during the past week, but the improvement is spotty in that it does not apply to all companies nor to all products alike. Unless there is much more of a gain than has occurred thus far, July tonnage as a whole may not equal that of June for all companies.

None of the steel products have had anything like the spurt in buying that occurred in pig iron following the reduction in prices. Steel consumers are still cautious, being influenced to

some extent perhaps by the uncertainty as to wage reduction in the steel industry. While many buyers readily admit that steel prices are as low as might reasonably be expected, they find no occasion to anticipate their needs except as their own business shows an increase.

In view of the opposition in Washington to wage reductions, lowering of costs by this method is now regarded as less likely than it appeared to be a few weeks ago. If there is no wage cut, the industry's only means of recouping its losses is in increased

production and higher prices. While there is much unofficial talk of the necessity of increasing mill net yield, a better rate of production is needed to give strength to a price increase.

Pig Iron

During the past week, some additional orders were placed for third quarter iron, and by now most consumers have covered themselves for the period and longer. A great deal of this buying is considered speculative on the basis of persistent rumors of an upward revision in price of \$1, inasmuch as practically no change is discerned in foundry melt or in releases on old orders. These average 50 to 100 tons, except in the example of very large consumers.

Plates and Shapes

Plate sales are still dragging along the bottom, with practically no large tonnages being placed. One seller reported a scattering of orders averaging 5 tons apiece, mostly from tank builders, some of whom had a little refinery business. The city scow job, involving 9000 tons, is still hanging fire, but is expected to be awarded to three yards in the city limits.

Plates are now being sold to Europe on the basis of \$1.80 per 100 lb. f.a.s. to meet cartel prices established last week. For some time, plates have been sold to the Orient at prices considerably under the former cartel price of \$1.91½ f.a.s., being quoted as low as \$1.83 in recent weeks. Inquiries and orders are light, however.

Some fairly substantial sheet tonnages were placed last week on the basis of inquiries made almost two months ago but on which action was withheld until the price situation had been clarified.

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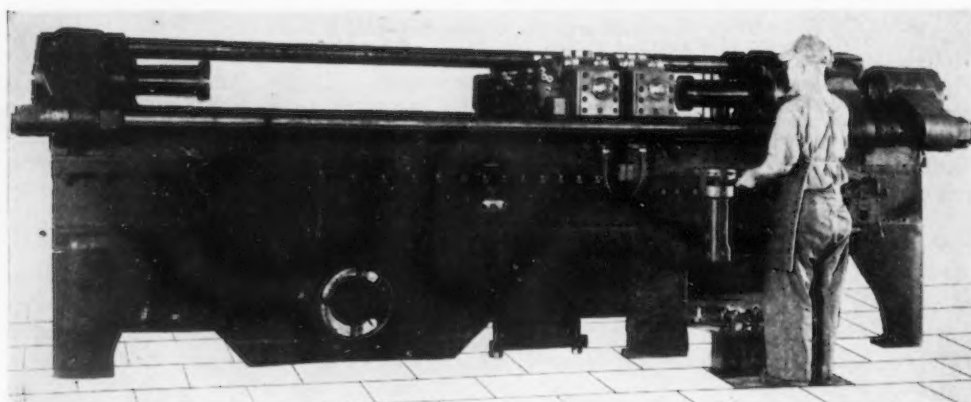
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...NON-FERROUS...

Domestic copper inactivity offset by foreign interest . . . Heavy July lead deliveries continue . . . Zinc completely listless, with week's sales only 558 tons . . . Mounting tin price fails to bring forth buying interest.

NEW YORK, July 19.—With domestic copper consumers pretty well over-bought for the time being, sellers are concerned primarily with delivering on old contracts and watching the foreign market. There are insistent calls for the metal from abroad, the price today being in the neighborhood of 9.93c. per lb., Continental base ports, and domestic producers are placing moderate quantities of copper in that direction. Some sentiment here is to the effect that if the foreign price were to move above

9.95c., it would suggest an early advance to a 10c. level in this market. A very active London market might, of course, force such action here, but at the moment the domestic 9.75c. price, valley points, is apparently very firm, and any advance over this figure would probably encounter considerable consumer resistance.

Lead

The lead market also is somewhat oversold, current activity being entire-

ly of a carload nature with hardly 25 per cent of estimated August requirements yet to be placed. The price appears to be quite steady at 4.75c. a lb., East St. Louis. A somewhat better outlook for the lead industry is indicated by improved activity in two major outlets, automobiles and building construction.

Zinc

Although a few week-to-week buyers are in and out of the market for carload commitments, the bulk of the consuming trade is glutted with spelter and are in no mood to consider additional purchases. The result is almost complete inactivity, with the price apparently quite steady at 4.75c. a lb., East St. Louis. Ore production in the Tri-State district is showing some improvement, but prices there are unchanged from last week.

Tin

The tin market continues very dull, the most significant feature being that enthusiasm on Wall Street has certainly as yet failed to encourage tin consumers to come in for additional supplies. It is perfectly obvious that users of the metal are going to wait for some pick-up in their own business before burdening themselves with additional tin inventory, irrespective of price movements in the meantime. Straits metal in New York moved both down and up during the week, ending today in the neighborhood of 43.35c. per lb. On first call this morning, prompt metal in London moved at a fair pace at £193, three-month metal at £194 and tin in the Far East was quoted at £196 17s. 6d.

The Week's Prices. Cents Per Pound for Early Delivery

	July 13	July 14	July 15	July 16	July 18	July 19
Electrolytic copper, Conn.*	9.75	9.75	9.75	9.75	9.75	9.75
Lake copper, N. Y.	9.875	9.875	9.875	9.875	9.875	9.875
Straits tin, spot, New York	43.60	42.90	43.15		43.10	43.35
Zinc, East St. Louis	4.75	4.75	4.75	4.75	4.75	4.75
Zinc, New York	5.14	5.14	5.14	5.14	5.14	5.14
Lead, St. Louis	4.75	4.75	4.75	4.75	4.75	4.75
Lead, New York	4.90	4.90	4.90	4.90	4.90	4.90

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.00c. a lb., prompt, f.o.b., New York.
Antimony, American, 11.25c. per lb., prompt shipment, New York.
Quicksilver, \$82.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 10.25c. a lb., less carload, delivered in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse Delivered Prices, Base per Lb.

Tin, Straits pig	45.00c. to 46.00c.
Tin, bar	47.00c. to 48.00c.
Copper, Lake	10.50c. to 11.50c.
Copper, electrolytic	10.50c. to 11.50c.
Copper, castings	10.00c. to 10.25c.
*Copper sheets, hot-rolled	17.625c.
*High brass sheets	16.125c.
*Seamless brass tubes	18.875c.
*Seamless copper tubes	18.125c.
*Brass rods	12.125c.
Zinc, slabs	6.00c. to 7.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.50c.
Lead, American pig	5.50c. to 6.50c.
Lead, bar	6.25c. to 6.625c.
Lead, sheets, cut	7.75c.
Antimony, Asiatic	15.25c. to 16.25c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	29.00c. to 30.00c.
Babbitt metal, commercial grade	20.00c. to 50.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse Delivered Prices per Lb.

Tin, Straits, pig	47.00c.
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Tin, bar	49.00c.
Copper, Lake	10.75c. to 11.00c.
Copper, electrolytic	10.75c. to 11.00c.
Copper, castings	10.50c.
Zinc, slabs	7.50c. to 7.75c.
Lead, American pig	5.40c. to 5.65c.
Lead, bar	8.50c.
Antimony, Asiatic	17.75c. to 18.00c.
Babbitt metal, medium grade	21.25c.
Babbitt metal, high grade	51.00c.
Solder, ½ and ½	28.25c.

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.375c.	8.125c.
Copper, hvy. and wire	6.40c.	7.00c.
Copper, light and bottoms	6.00c.	6.25c.
Brass, heavy	4.00c.	4.50c.
Brass, light	3.00c.	3.85c.
Hvy. machine composition	6.25c.	7.75c.
No. 1 yel. brass turnings	4.125c.	4.625c.
No. 1 red brass or compos. turnings	5.635c.	4.875c.
Lead, heavy	3.50c.	3.875c.
Cast aluminum	5.50c.	6.75c.
Sheet aluminum	10.00c.	11.50c.
Zinc	2.125c.	3.375c.

RAILROAD BUYING

Seaboard Air Line has applied for authority to issue \$1,508,000 in equipment trust certificates to finance the purchase of nine Diesel locomotives to be built by the Electro-Motive Corp., La Grange, Ill. Total cost is estimated at \$1,671,500.

Pressed Steel Car Co., Inc., Pittsburgh, is low bidder on the 50 box cars inquired for by the Manila Railroad. Gregg Co., Ltd., New York, is low bidder on 50 flat cars of 30 metric tons capacity for the same road.

Pennsylvania Railroad has divided a contract evenly between Westinghouse Electric & Mfg. Co. and General Electric Co. for electrical equipment for 20 high-speed passenger locomotives at a total cost of \$3,400,000.

Carnegie-Illinois Steel Corp. is planning to buy nine to 18 sets of trucks for 90-ton drop-end cars.

Wheeling & Lake Erie is contemplating the purchase of five freight locomotives.

IRON AND STEEL SCRAP

JULY 19.—With the Pittsburgh market quiet and prices unchanged except on some railroad specialties, but with the pot still boiling in Philadelphia the spread of \$1 for No. 1 steel between these two markets that existed last week for the first time since November, has been halved. The top price for No. 1 steel is now \$14.50 at Pittsburgh and \$14 at Philadelphia. Scrap is being closely held all over. Brokers at Chicago have been obliged to offer as much as \$12.50 to cover the last mill order at \$11.75. Covering of short interests at St. Louis has resulted in bids 25c. to \$1.50 higher to attract material held in yards for higher prices. As a result of these changes, the composite price for No. 1 heavy melting steel in the three principal markets is \$13.42, up 34c. from last week's average of \$13.08 and equal to the figure prevailing on March 8.

No new mill transactions are reported, but a strong undertone prevails all over the country. Yard dealers have caught the bullish fever of the brokers and are holding on to their inventories. Practically the entire lists have been affected upward at Chicago, Cleveland, Buffalo, St. Louis and Cincinnati, largely as a result of this sentiment.

Pittsburgh

Although on the surface the market has been very quiet this past week, the undertone is still slightly bullish. The true strength of the present market is derived primarily from the dealers who are extremely reluctant to part with material. Some small activity in railroad specialties has made these grades quotable at \$16.50 to \$17, up 50c. from a week ago, while No. 1 steel remains, by the lack of sales, unchanged with a \$14.50 top.

Chicago

Although the last mill sale was at \$11.75, efforts to cover on this order have boosted offering prices as high as \$12.50 in some instances. Unconfirmed reports have been heard of \$12.65 and \$12.75 bids for industrial steel and over \$13 bid to railroads. Little material is moving and what scrap is on hand is being guarded closely in the hope of still higher prices. Mill operations increased this week and will probably rise again next week, but the advance in prices can only be considered as speculative to date.

Philadelphia

This market continues to boil, the heat figuratively being derived from a mounting operating rate, so-called scrap scarcity, and intense broker competition. To broker bullishness must go the credit for much of the current price buoyancy, as mills are only hesitatingly taking flings in the market. An Italian export boat due in today will take on 4000 tons of steel, all of which had been bought for

some time with the exception of 600 or 800 tons of No. 1, which tonnage was recently accumulated at Port Richmond at prices up to \$13. This activity in turn forced up domestic quotations to \$13.50 to \$14, all dependent grades being arbitrarily marked up sympathetically.

Cleveland

Cleveland quotations this week are up 50c. per ton in line with strength exhibited in other nearby markets. With ingot output improving, sentiment among brokers has brightened, but the movement in the local market is for the most part toward out of town points.

Buffalo

With a strong undertone prevailing, scrap prices were 50c. higher this week. No. 1 heavy melting steel was nominally quoted at \$12.50 to \$13, with the usual differential in No. 2 steel. No sales are reported and dealers are refusing higher bids. It is a sellers' market, although the principal consumer in the area has a record stock pile. No further boat shipments are reported. Scrap castings jumped 50c. with No. 1 cupola cast selling at \$14.50 to \$15.

St. Louis

The scrap iron market continues strong, and prices are from 25c. to \$1.50 a ton higher on most items. The strength is due entirely to activities of dealers, who have advanced prices in an endeavor to bring out material to meet short contracts. No material is being offered by country or city dealers, who are holding for higher prices. The hot weather has been a deterrent in that it has hindered the gathering and handling of scrap iron. Railroad lists: Chicago, Rock Island & Pacific, 5600 tons; Missouri-Kansas-Texas, 550 tons; Pennsylvania (special list), 400 tons; and Chicago, Burlington & Quincy, 3500 tons.

Detroit

Occasional transactions involving carload lots have provided the only activity for the Detroit market recently. A strongly bullish sentiment still prevails among the dealers and brokers, but mill buying has not developed to support them. Automotive lists for August should begin to make their appearance next Monday. Production undoubtedly will be very low, but the scrap output should provide some test of the market.

Cincinnati

With demand for No. 1 steel persistent and interest in rail items more active, dealers are bidding strongly to get these materials. Success so far as steel is concerned is still limited, because dealers have not reached a bid level sufficient to attract No. 1 steel into the market.

New York

As high as \$11 a ton is being paid for No. 1 steel delivered to barges, and probably higher for large tonnage lots. Buying prices for No. 2 steel and No. 2 cast have also been advanced as slowing up of yard activity due to the oppressive heat wave has tended further to restrict the supply, particularly of No. 1 steel. Shipments to Europe are going forward, and some material on old order is being loaded for Japan at Charleston and Baltimore.

Prices for scrap on car for domestic consumption have been advanced in tune with rises in eastern Pennsylvania delivered prices. Heavy breakable cast is up \$1.

Boston

The market for heavy melting steel, both domestic and export is firmer. Dealers are talking higher prices for machinery cast. However, both kinds of scrap are coming on the market in such dribbling lots, brokers are rather hard pressed to fill orders previously booked.

Move for Slash in South's Rail Rates May Involve Wages

WASHINGTON.—While great importance is attached to the application of nine Southern states for reduction of rail rates to a parity with those prevailing in Official Classification territory—north of the Potomac and Ohio Rivers and east of the Mississippi—it does not involve the general line of rolled iron and steel products. Apparently the petitioning states are satisfied with the iron and steel mileage scale as related to the Northern scale.

Since Southern steel production is confined principally to the Birmingham district attack on the Southern steel rate structure, it has been suggested, would be largely local, whereas the petition covers a broad rate structure as it relates to Southern commodities of wide geographical production, an outstanding example of which is textiles. Special steels and non-ferrous products and their manufactured lines, however, are included in the petition. These include metal alloys of all kinds.

The Southern application has aroused particular interest at this time because of the newly enacted wage-hour act, which becomes effective Oct. 24. With Elmer F. Andrews, New York State Industrial Commissioner named as administrator, organization of machinery to operate the new law soon will be in operation and it is expected that one of its early problems will be the determination or elimination of Northern-Southern wage differentials.

A great deal of interest is being shown over what may be done under the new law by way of readjusting or wiping out the Southern steel wage differential and its possible effect of offsetting the advantage of \$3 to \$7 per ton the Birmingham district obtained through equalization of prices on a Pittsburgh basis, the general steel freight rates to remain unchanged.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$14.00 to \$14.50
Railroad hvy. mltng.	14.50 to 15.00
No. 2 hvy. mltng. steel	12.50 to 13.00
Scrap rails	15.00 to 15.50
Rails 3 ft. and under	16.00 to 16.50
Comp. steel	14.00 to 14.50
Hand bundled sheets	13.00 to 13.50
Hvy. steel axle turn	12.50 to 13.00
Machine shop turn	8.50 to 9.00
Short shov. turn	8.50 to 9.00
Mixed bor. & turn	6.50 to 7.00
Cast iron borings	6.50 to 7.00
Cast iron carwheels	14.00 to 14.50
Hvy. breakable cast	12.50 to 13.00
No. 1 cupola cast	14.50 to 15.00
RR. knuckles & cplrs	16.50 to 17.00
Rail coil & leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phos. billet crops	16.50 to 17.00
Low phos. punchings	15.00 to 15.50
Low phos. plate	14.00 to 15.00

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$13.50 to \$14.00
No. 2 hvy. mltng. steel	12.00 to 12.50
Hydraulic bund., new	13.50 to 14.00
Hydraulic bund., old	10.50 to 11.00
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	15.50 to 16.00
Hvy. breakable cast	15.00 to 15.50
No. 1 cast	15.50 to 16.00
Stove plate (steel wks.)	12.50 to 13.00
Railroad malleable	15.00 to 15.50
Machine shop turn	7.00 to 7.50
No. 1 blast furnace	6.00 to 6.50
Cast borings	6.00 to 6.50
Heavy axle turnings	10.00 to 10.50
No. 1 low phos. hvy.	16.50 to 17.00
Couplers & knuckles	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Steel axles	20.00 to 20.50
Shafting	19.00 to 19.50
No. 1 RR. wrought	15.00 to 15.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	10.50 to 11.00
Cast borings (chem.)	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel	\$12.00 to \$12.50
Auto. hvy. mltng. steel alloy free	10.50 to 11.00
No. 2 auto. steel	10.00 to 10.50
Shoveling steel	12.00 to 12.50
Factory bundles	11.25 to 11.75
Dealers' bundles	10.50 to 11.00
Drop forge flashings	9.25 to 9.75
No. 1 busheling	10.00 to 10.50
No. 2 busheling, old	4.25 to 4.75
Rolled carwheels	14.50 to 15.00
Railroad tires, cut	15.00 to 15.50
Railroad leaf springs	15.00 to 15.50
Steel coup. & knuckles	14.00 to 14.50
Axle turnings	11.00 to 11.50
Coil springs	15.50 to 16.00
Axle turn. (elec.)	11.50 to 12.00
Low phos. punchings and under	15.00 to 15.50
Cast iron borings	5.50 to 6.00
Short shov. turn	6.50 to 7.00
Machine shop turn	5.50 to 6.00
Rerolling rails	15.50 to 16.00
Steel rails under 3 ft.	14.50 to 15.00
Steel rails under 2 ft.	15.00 to 15.50
Angle bars, steel	13.00 to 13.50
Cast iron carwheels	13.50 to 14.00
Railroad malleable	13.25 to 13.75
Agric. malleable	10.50 to 11.00
Per Net Ton	
Iron car axles	18.00 to 18.50
Steel car axles	17.50 to 18.00
No. 1 RR. wrought	10.25 to 10.75
No. 2 RR. wrought	10.75 to 11.25
Locomotive tires	15.50 to 16.00
Pipes and flues	8.50 to 9.00
No. 1 machinery cast	12.00 to 12.50
Clean auto. cast	11.00 to 11.50
No. 1 railroad cast	11.75 to 12.25
No. 1 agric. cast	10.50 to 11.00
Stove plate	8.50 to 9.00
Grate bars	8.50 to 9.00
Brake shoes	9.00 to 9.50

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$13.00 to \$13.50
Hydraulic bundles	12.50 to 13.00
Machine shop turn	8.50 to 9.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$12.00 to \$12.50
No. 2 hvy. mltng. steel	11.00 to 11.50
Comp. sheet steel	11.25 to 11.75
Light bund. stampings	8.50 to 9.00
Drop forge flashings	10.00 to 10.50
Machine shop turn	6.00 to 6.50
Short shov. turn	6.75 to 7.25
No. 1 busheling	10.50 to 11.00
Steel axle turnings	10.00 to 10.50
Low phos. billet and bloom crops	17.00 to 17.50
Cast iron borings	6.00 to 6.50
Mixed bor. & turn	6.00 to 6.50
No. 2 busheling	6.00 to 6.50
No. 1 cast	14.00 to 14.50
Railroad grate bars	9.00 to 9.50
Stove plate	8.50 to 9.00
Rails under 3 ft.	16.50 to 17.00
Rails for rolling	14.50 to 15.00
Railroad malleable	14.00 to 14.50
Cast iron carwheels	14.50 to 15.00

BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$12.50 to \$13.00
No. 2 hvy. mltng. steel	10.50 to 11.00
Scrap rails	15.00 to 15.50
New hvy. b'ndled sheets	10.50 to 11.00
Old hydraulic bundles	9.00 to 9.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	10.50 to 11.00
Hvy. axle turnings	10.50 to 11.00
Machine shop turn	6.50 to 7.00
Knuckles & couplers	16.50 to 17.00
Coil & leaf springs	16.50 to 17.00
Rolled steel wheels	16.00 to 16.50
Low phos. billet crops	15.50 to 16.00
Shov. turnings	6.50 to 7.00
Mixed bor. & turn	6.50 to 7.00
Cast iron borings	6.50 to 7.00
Steel car axles	16.50 to 17.00
No. 1 machinery cast	15.00 to 15.50
No. 1 cupola cast	14.50 to 15.00
Stove plate	12.00 to 12.50
Steel rails under 3 ft.	17.50 to 18.00
Cast iron carwheels	13.50 to 14.00
Railroad malleable	12.50 to 13.00
Chemical borings	8.50 to 9.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$11.50 to \$12.00
No. 1 hvy. melting	11.50 to 12.00
No. 2 hvy. melting	10.75 to 11.25
No. 1 locomotive tires	12.00 to 12.50
Misc. stand. sec. rails	11.50 to 12.00
Railroad springs	13.00 to 13.50
Bundled sheets	5.50 to 6.00
No. 1 busheling	5.50 to 6.00
Cast bor. & turn	2.00 to 2.50
Machine shop turn	2.75 to 3.25
Heavy turnings	8.00 to 8.50
Rails for rolling	14.25 to 14.75
Steel car axles	16.00 to 16.50
Iron car axles	19.50 to 20.00
No. 1 RR. wrought	8.00 to 8.50
No. 2 RR. wrought	11.00 to 11.50
Steel rails under 3 ft.	14.00 to 14.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	12.25 to 12.75
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	10.50 to 11.00
Stove plate	8.00 to 8.50
Grate bars	8.50 to 9.00
Brake shoes	8.50 to 9.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	\$10.75 to \$11.25
No. 2 hvy. mltng. steel	8.50 to 9.00
Scrap rails for mltng.	15.00 to 15.50
Loose sheet clippings	5.75 to 6.25
Hydrau. b'ndled sheets	9.75 to 10.25
Cast iron borings	3.25 to 3.75
Machine shop turn	3.75 to 4.25
No. 1 busheling	8.00 to 8.50
No. 2 busheling	2.75 to 3.25
Rails for rolling	17.00 to 17.50
No. 1 locomotive tires	13.75 to 14.25
Short rails	17.50 to 18.00
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	11.50 to 12.00
No. 1 railroad cast	10.00 to 10.50
Burnt cast	7.00 to 7.50
Stove plate	7.00 to 7.50
Agricul. malleable	11.50 to 12.00
Railroad malleable	13.50 to 14.00
Mixed hvy. cast	8.75 to 9.25

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$12.00 to \$12.50
Scrap steel rails	14.00 to 14.50
Short shov. turnings	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought	10.00
Rails for rolling	15.00 to 16.00
No. 1 cast	14.50 to 15.00
Tramcar wheels	14.50

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel	\$10.00 to \$10.50
No. 2 hvy. mltng. steel	8.50 to 9.00
Borings and turnings	5.50 to 6.00
Long turnings	6.00 to 6.50
Short shov. turnings	7.50 to 8.00
No. 1 machinery cast	11.50 to 12.00
Automotive cast	11.50 to 12.00
Hvy. breakable cast	9.00 to 9.50
Hydraul. comp. sheets	10.50 to 11.00
Stove plate	6.75 to 7.25
New factory bushel	10.00 to 10.50
Old No. 2 busheling	2.50 to 3.00
Sheet clippings	7.50 to 8.00
Flashings	8.00 to 8.50
Low phos. plate scrap	11.00 to 11.50

NEW YORK

Dealers' buying prices per gross ton on cars:	
No. 1 hvy. mltng. steel	\$10.00 to \$10.50
No. 2 hvy. mltng. steel	8.50 to 9.00
Hvy. breakable cast	11.00 to 11.50
No. 1 machinery cast	11.50 to 12.00
No. 2 cast	9.00 to 9.50
Stove plate	8.50 to 9.00
Steel car axles	20.00 to 20.50
Shafting	15.00 to 15.50
No. 1 RR. wrought	11.00 to 11.50
No. 1 wrought long	9.50 to 10.00
Spec. iron & steel pipe	8.50 to 9.00
Rails for rolling	16.00 to 16.50
Clean steel turnings*	3.00 to 3.50
Cast borings*	3.00 to 3.50
No. 1 blast furnace	3.00 to 3.50
Cast borings (chem.)	9.50 to 10.00
Unprepared yard scrap	4.50 to 5.00
Light iron	3.00 to 3.50
Per gross ton delivered local foundries:	
No. 1 machn. cast	\$13.00 to \$14.00
No. 2 cast	10.50 to 11.00

*\$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel	\$13.00 to \$13.50
Scrap rails	13.00 to 13.50
No. 2 steel	12.00 to 12.50
Breakable cast	8.75 to 9.00
Machine shop turn	2.35
Mixed bor. & turn	2.25
Bun. skeleton long	5.50 to 5.75
Shafting	13.50 to 14.00
Cast bor. chemical	5.50
Per gross ton delivered consumers' yards:	
Textile cast	\$12.00 to \$12.50
No. 1 machine cast	12.00 to 12.50

PACIFIC COAST

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$11.65 to \$12.15
No. 2 hvy. mltng. steel	10.65 to 11.15

CANADA

Dealers' buying prices at their yards, per gross ton:	
Toronto Montreal	
No. 1 hvy. mltng. steel	\$10.50 \$9.50
No. 2 hvy. mltng. steel	9.50 8.50
Mixed dealers steel	8.50 7.50
Scrap pipe	8.50 7.50
Steel turnings	7.50 7.00
Cast borings	8.50 7.50
Machinery cast	15.00 14.00
Dealers cast	13.00 12.00
Stove plate	11.00 10.50

EXPORT

Dealers' buying prices per gross ton:	
New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel	\$10.50 to \$11.00
No. 2 hvy. mltng. steel	9.50 to 9.75
No. 2 cast	9.25 to 9.50
Stove plate	8.00

Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel	\$11.00 to \$11.25
No. 2 hvy. mltng. steel	10.00 to 10.25
Rails (scrap)	11.00 to 11.25
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel	Nominal
No. 2 hvy. mltng. steel	Nominal

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling\$34.00
Forging quality 40.00

Sheet Bars
Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open-hearth or bessemer\$34.00

Skelp
Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.
Per Lb.
Grooved, universal and sheared1.90c.

Wire Rods
(No. 5 to 9/32 in.)
Per Gross Ton

Pittsburgh, Chicago or Cleveland\$43.00
Worcester, Mass. 45.00
Birmingham 43.00
San Francisco 52.00
Rods over 9/32 in. or 47/64 in., inclusive, \$5 a ton over base.

SOFT STEEL BARS

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.25c.
Detroit, delivered 2.35c.
Duluth 2.35c.
Philadelphia delivered 2.57c.
New York 2.59c.
On cars dock Gulf ports..... 2.60c.
On cars dock Pacific ports ... 2.85c.

RAIL STEEL BARS

(For merchant trade)
Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.10c.
On cars dock Tex. Gulf ports.. (—)
On cars dock Pacific ports... (—)

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)
Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 2.05c.
Detroit, delivered 2.15c.
On cars dock Tex. Gulf ports... 2.40c.
On cars dock Pacific ports.... 2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)
Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham..... 1.90c.
Detroit, delivered 2.00c.
On cars dock Tex. Gulf ports. (—)
On cars dock Pacific ports..... (—)

IRON BARS

Chicago and Terre Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Base per Lb.
Pittsburgh, Buffalo, Cleveland, Chicago and Gary 2.70c.
Detroit 2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c.
Philadelphia, del'd 2.15c.
New York, del'd 2.23c.
On cars dock Gulf ports..... 2.45c.
On cars dock Pacific ports..... 2.70c.
Wrought iron plates, P't'g.... 3.80c.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports.... 3.95c.

STRUCTURAL SHAPES

Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports..... 2.45c.
On cars dock Pacific ports.... 2.70c.

STEEL SHEET PILING

Base per Lb.
Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill
Standard rails, heavier than 60 lb., per gross ton.....\$42.50
Angle bars, per 100 lb. 2.80

F.o.b. Basing Points
Light rails (from billets) per gross ton\$40.00
Light rails (from rail steel) per gross ton 39.00

Base per l.b.
Spikes 3.15c.
Tie plates, steel 2.30c.
Tie plates, Pacific Coast ports. 2.40c.
Track bolts, to steam railroads 4.35c.
Track bolts, to jobbers, all sizes (per 100 counts) 65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

PRICES F.O.B. UNLESS OTHERWISE NOTED

Hot Rolled

Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown or Middletown 2.15c.
Detroit, delivered 2.25c.
Philadelphia, delivered 2.32c.
Granite City 2.25c.
On cars dock Pacific ports... 2.75c.
Wrought iron, Pittsburgh..... 4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland or Middletown 3.20c.
Detroit, delivered 3.30c.
Granite City 3.30c.
Philadelphia, delivered 3.52c.
On cars dock Pacific ports.... 3.80c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports.... 4.10c.
Wrought iron, Pittsburgh..... 6.10c.

Electrical Sheets (F.o.b. Pittsburgh)

Base per Lb.
Field grade 3.20c.
Armature 3.55c.
Electrical 4.05c.
Special Motor 4.95c.
Special Dynamo 5.65c.
Transformer 6.15c.
Transformer Special 7.15c.
Transformer Extra Special... 7.65c.

Silicon Strip in coils—Sheet price plus slit-con sheet extra width extras plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary.... 3.95c.
F.o.b. cars dock Pacific ports. 4.65c.

Vitreous Enameling Stock, 20 Gage

Pittsburgh, Gary Youngstown, Middletown or Cleveland.... 3.35c.
Detroit, del'd 3.45c.
Granite City 3.45c.
On cars dock Pacific ports ... 3.95c.

TIN MILL PRODUCTS

Black Plate

Pittsburgh 3.30c.
Gary 3.40c.
Granite City 3.50c.
On cars dock Pacific ports, boxed 4.175c.

Tin Plate

Base per Lb.
Standard cokes, Pittsburgh....\$5.35
Standard cokes, Gary 5.45
Standard cokes, Granite City... 5.55

Special Coated Manufacturing Ternes

Base per Lb.
Pittsburgh\$4.65
Gary 4.75
Granite City 4.85

Roofing Terne Plate

(F.o.b. Pittsburgh)
(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C.....\$12.00
15-lb. coating I.C..... 14.00
20-lb. coating I.C..... 15.00
25-lb. coating I.C..... 16.00
30-lb. coating I.C..... 17.25
40-lb. coating I.C..... 19.50

HOT ROLLED STRIP

Prices F.o.b. Unless Otherwise Noted
(Widths up to 12 in.)

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.15c.
Detroit, delivered 2.25c.

Cooperage Stock

Pittsburgh & Chicago 2.25c.

COLD ROLLED STRIP*

Base per Lb.
Pittsburgh, Youngstown or Cleveland 2.95c.
Chicago 3.05c.
Detroit, delivered 3.05c.
Worcester 3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown or Cleveland 3.10c.
Detroit, delivered 3.20c.
Worcester 3.50c.

COLD ROLLED SPRING STEEL

Pittsburgh and Cleveland Worcester
Carbon 0.26-0.50% 2.95c. 3.15c.
Carbon .51-.75 4.30c. 4.50c.
Carbon .76-1.00 6.15c. 6.35c.
Carbon 1.01 to 1.25 8.35c. 8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire	3.15c.
Spring wire	3.20c.

To the Trade

	Base per Keg
Standard wire nails	\$2.45
Coated nails	2.45
Cut nails, carloads	3.60

Base per 100 Lb.

Annealed fence wire	\$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Barbed wire, galvanized	3.20
Twisted barless wire	3.20
Woven wire fence, base column. 67	
Single loop bale ties, base col. 56	

Note: Birmingham base same on above items, except spring wire.

Add \$4 a ton for Mobile, Ala.; \$5 for New Orleans; \$6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are \$1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

In.	Steel Black Galv.	Wrought Iron Black Galv.
1/2	56 36	1/2 & 3/4 + 9 + 30
3/4	59 43 1/2	1/2 24 6 1/2
1	63 1/2 54	3/4 30 13
1 1/4	66 1/2 58	1 & 1 1/4 34 19
1 1/2	68 1/2 60 1/2	1 1/2 38 21 1/2
2	72 1/2 64	2 37 1/2 21

Lap Weld

2	61 52 1/2	2 30 1/2 15
2 1/2	64 55 1/2	2 1/2 to 3 1/2 31 1/2 17 1/2
3 1/2	66 57 1/2	4 33 1/2 21
4	68 59	4 1/2 to 5 1/2 34 1/2 22
5	70 61 1/2	5 36 1/2 23
6	72 63 1/2	6 38 1/2 24 1/2
7	74 65 1/2	7 40 1/2 25 1/2
8	76 67 1/2	8 42 1/2 26 1/2
9	78 69 1/2	9 44 1/2 27 1/2
10	80 71 1/2	10 46 1/2 28 1/2
11	82 73 1/2	11 48 1/2 29 1/2
12	84 75 1/2	12 50 1/2 30 1/2

Butt Weld, extra strong, plain ends

1/2	54 1/2 41 1/2	1/2 & 3/4 + 10 + 43
3/4	56 1/2 43 1/2	1/2 25 9
1	58 1/2 45 1/2	3/4 31 15
1 1/4	60 1/2 47 1/2	1 to 2 38 22 1/2
1 1/2	62 1/2 49	
2	64 1/2 51	

Lap Weld, extra strong, plain ends

2	59 51 1/2	2 33 1/2 18 1/2
2 1/2	63 55 1/2	2 1/2 to 4 3/4 35 1/2 20 1/2
3 1/2	66 59	4 1/2 to 6 3/4 37 1/2 22 1/2
4	68 61 1/2	5 39 1/2 23 1/2
5	70 63 1/2	6 41 1/2 24 1/2
6	72 65 1/2	7 43 1/2 25 1/2
7	74 67 1/2	8 45 1/2 26 1/2
8	76 69 1/2	9 47 1/2 27 1/2
9	78 71 1/2	10 49 1/2 28 1/2
10	80 73 1/2	11 51 1/2 29 1/2
11	82 75 1/2	12 53 1/2 30 1/2
12	84 77 1/2	

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30c. and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 3 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld Hot Rolled
1 in. o.d. 13 B.W.G.	\$ 9.01	\$ 7.82	....
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26	....
1 1/2 in. o.d. 13 B.W.G.	11.79	10.23	9.72
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54	13.79
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01	15.16
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 1/2 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3 3/4 in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4 1/2 in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. or over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.....	\$51.00
6-in. and larger, del'd New York.....	49.00
*6-in. and larger, Birmingham.....	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles.....	52.00
F.o.b. dock, Seattle.....	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles.....	55.00
F.o.b. dock, Seattle.....	52.00

Class "A" and gas pipe, \$3 extra 4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$42, Birmingham, and \$50 delivered Chicago and 4-in. pipe, \$45, Birmingham, and \$54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. & 6 in. and smaller. 65, 5 and 5*	
Larger and longer up to:	
1 in.	60, 10 and 5*
1 1/2 in. and larger.....	60, 5 and 5*
Lag bolts	60, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7	65, 5 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
1/2 in. and smaller	65 and 5
9/16 in. to 1 in. inclusive. 60, 5 and 5	
1 1/2 in. and larger.....	60 and 5

* Less carload lots and less than full container quantity. Less carloads lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon units, U.S.S. and S.A.E.:

1/2 in. and smaller.....	60, 10 and 5
9/16 in. to 1 in. inclusive. 60, 5 and 5	
1 in. and larger	60 and 5
Stove bolts in packages, nuts attached	70 and 5
Stove bolts in packages, with nuts separate	70, 10 and 5
Stove bolts in bulk.....	80 and 5

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham\$3.40

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	50, 10 and 5
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 5
Milled headless set screws, cut thread 1/2 in. and smaller.....	75
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70, 10 and 10
Upset set screws, cup and oval points	80 and 5
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, \$56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base.....2.80c. Delivered, Detroit2.90c.

S.A.E. Series	Alloy Numbers	Differential per 100 Lb.
200 (1/2% Nickel).....		\$0.35
2100 (1 1/2% Nickel).....		0.75
2300 (3 1/2% Nickel).....		1.55

2500 (5% nickel)	\$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum) ..	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum) ..	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni) ..	1.10
5100 Chrome steel (0.60-0.90 Cr.) ..	0.35
5100 Chrome steel (0.80-1.10 Cr.) ..	0.45
5100 Chromium spring steel.....	0.15
6100 Chromium-vanadium bar..	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium ..	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.40c. base per lb. Delivered Detroit, 3.50c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes..	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip ..	23.50c.	21.50c.
Cold-rolled strip ..	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars ..18.50c.	19c.	22.50c.	27.50c.	27.50c.
Plates 21.50c.	22c.	25.50c.	30.50c.	30.50c.
Sheets 26.50c.	29c.	32.50c.	36.50c.	36.50c.
Hot strip 17c.	17.50c.	23c.	28c.	28c.
Cold stp. 22c.	22.50c.	28.50c.	36.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	20s. 3d. to 21s. 6d.
Steel bars, open hearth.....	£11
Beams, open-hearth	£10 12s. 6d.
Channels, open-hearth ..	£10 17s. 6d.
Angles, open-hearth	£10 12s. 6d.
Black sheets, No. 24 gage.....	£13
Galvanized sheets, No. 24 gage	£16 15s.

CONTINENTAL

Per Gross Ton, Gold f. f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant.....	£5 5s.
Sheet bars	Nominal
Plate 1/2 in. and up.....	£6 7s.
Plate 3/16 in. and 5 mm.	£6 13s.
Sheet, 1/2 in.	£6 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base.....	£5 15s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$21.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	21.00
Delivered Brooklyn	23.50
Delivered Newark or Jersey City	22.53
Delivered Philadelphia	21.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago and Youngstown*	20.00
F.o.b. Buffalo	20.00
F.o.b. Detroit	20.00
Southern, delivered Cincinnati	20.06
Northern, delivered, Cincinnati	20.44
F.o.b. Duluth	20.50
F.o.b. Provo, Utah	22.00
Delivered, San Francisco, Los Angeles or Seattle	26.95
F.o.b. Birmingham*	16.38

* Delivered prices on southern iron for shipment to northern points are 33c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$21.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	20.50
F.o.b. Buffalo	19.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago and Youngstown*	19.50
Delivered Philadelphia	21.34
Delivered Canton, Ohio	20.89
Delivered Mansfield, Ohio	21.44
F.o.b. Birmingham	15.00

Bessemer

F.o.b. Buffalo	\$21.00
F.o.b. Everett, Mass.	22.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	22.00
Delivered Newark or Jersey City	23.53
Erie, Pa., and Duluth	21.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown*	20.50
F.o.b. Birmingham	21.00
Delivered Cincinnati	21.11
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$25.50
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Gray Forge

Valley or Pittsburgh furnace..	\$19.50
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Charcoal

Lake Superior furnace	\$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75....	\$26.50
No. 2 fdy., sil. 1.75 to 2.25....	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75....	\$27.50
No. 2 fdy., sil. 1.75 to 2.25....	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Domestic, 80% (carload).....	\$92.50

Spiegeleisen

Per Gross Ton Furnace	
Domestic 19 to 21%	\$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	\$69.50*
50% (ton lots in 50 gal. bbl.)..	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)..	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton	
10.00 to 10.50%	\$29.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional. Phosphorus 0.75% or over, \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$23.50
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For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	\$92.75
2.50% carbon	97.75
2% carbon	102.75
1% carbon	112.75

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally

Ferrotungsten, lots of 500 lbs. nominally

Ferrotungsten, smaller lots, nominally

Ferrovandium, contract, per lb. contained V., delivered

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.

Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton

Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton

Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville

Ferromolybdenum, per lb. Mo. f.o.b. furnace

Calcium molybdate, per lb. Mo. f.o.b. furnace

*Spot prices are \$5 per ton higher

†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50%....	\$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Mesabi, non-Bessemer, 51.50% ..	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal.17.00c.

Iron, low phos., Swedish, average, 68½% iron. Nominally 17 to 18c.

Iron, basic or foundry, Swedish, aver. 65% iron. Nominally 15c.

Iron, basic or foundry, Russian, aver. 65% iron. Nominal

Man., Caucasian, washed 52%

Man., African, Indian 44-48%

Man., African, Indian, 49-51%

Man., Brazilian, 46 to 48½%

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered

Tungsten, domestic, scheelite delivered

Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African

(low grade)

Rhodesian, 45%

Rhodesian, 48%

Turkish, 48-49%

Turkish, 45-46%

Turkish, 44%

Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:

50%

48-49%

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail

Domestic, f.o.b. Ohio River landing barges

No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines. \$18.00 to 19.00

Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid....

Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....

FUEL OIL

Per Gal.

No. 2 or diesel, f.o.b. Bayonne... 4.00c.

No. 6, f.o.b. Bayonne

Del'd Chicago, No. 5 Bur. Stds. 3.25c.

Del'd Chicago, No. 6 Bur. Stds. 2.75c.

Del'd Cleve'd, No. 3 distillate 5.50c.

Del'd Cleve'd, No. 4 industrial 5.00c.

Del'd Cleve'd, No. 5 industrial 3.25c.

Del'd Cleve'd, No. 6 industrial 3.00c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt

Foundry, f.o.b. Connellsville, Prompt

Foundry, by-product, Chicago ovens

Foundry, by-product, del'd New England....

Foundry, by-product, del'd Newark or Jersey City

Foundry, by-product, Philadelphia

Foundry, by-product, delivered Cleveland ...

Foundry, by-product, delivered Cincinnati ..

Foundry, Birmingham ..

Foundry, by-product, del'd St. Louis industrial district

Foundry, from Birmingham, f.o.b. cars dock, Pacific ports

THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... Gain in inquiries gives better feeling in some districts . . . Domestic orders still light, but show small increase in the East.

Orders Still Light In Cleveland Area

CLEVELAND—While prospects for the fall appear just a little brighter, order books of machine tool distributors and manufacturers remain light in this vicinity. It is pointed out that July and August customarily are seasonally slack. Inquiries are not entirely absent, quotations being asked almost daily for occasional machines, such as lathes or millers. Orders for small tools are consistent. In the used machinery market, inquiries are well maintained. Stocks of good used machines are adequate and high class equipment is none too easy to pick up right now, as prices have held up fairly well.

Domestic Business Off; Foreign Orders Sustained

CINCINNATI—Domestic machinery demand during the past week discounted the gain of the previous period, bringing averages down to about the level of mid-June. Foreign ordering continues to be well sustained. Bookings showing relatively no change. This latter demand is well diversified as to source, builders reporting business from several foreign nations, some of which were not among previous buyers. Orders up to three and four units have been received. In the domestic demand, business of small proportions from two automobile manufacturers tended to stimulate hope of early revival from this source.

There is not much change in factory operation. Plants without business to warrant 30 per cent operations are maintaining forces on repairs and stock machines.

Gain in Inquiries Promotes Better Feeling

CHICAGO—Because of increasing inquiries, a better feeling is being expressed in the trade here. Requests for quotations are coming in with less solicitation and sellers are working actively on several projects, most of which, however, consist of only one or two machine tools. Small tool shipments, which hit their low in June, are now averaging only about 37 per cent of last year's volume to date in one office, and are a full two-thirds below normal. Total shipments, including machine and small tools, for the first six months of 1938, are 37 per cent behind the same period last year.

Slight Pick-up Noted In Metropolitan Area

NEW YORK—Some dealers have experienced a noticeable improvement in ordering since the first of the month, and there seems to be a definite increase in inquiries generally. Some of the new business is coming from aircraft engine manufacturers, but the most substantial lot represented confirmation of verbal orders given a month ago. Ordering of machinery by a diesel builder who has a large Navy contract is expected momentarily.

..GREAT BRITAIN..

... Continent reports a better demand . . . British market quiet.

LONDON, July 19 (By Cable).—The Continent reports a better demand than there has been for some months despite the fact that July is usually seasonally quiet. Holland and Scandinavia are mainly interested but China is now in the market for various specifications, while Italy is buying ship plate.

The Cartel Coordinating Committee at the London meeting discussed only routine matters, excluding prices. It is reported that it is likely that penalties for overproduction will temporarily be nominal. The next meeting in London will be Sept. 6.

The British market is now under holiday influence with Scottish works closed till the end of July for the annual Glasgow Fair.

The pig iron market is idle, with stocks still accumulating, and no improvement is envisaged before autumn.

The glut of semi-finished steel is unrelieved.

Heavy steel makers are busy but contracts are expiring and new forward business is eagerly sought.

The tin plate market is quiet except for strong home export demand for

tarly. The Navy yards still furnish the chief prospects for new business, but general industry appears to be a little more interested in productive machinery than in some months. Of the Navy yards, Portsmouth is in the most forward position to issue formal inquiries. It will be some weeks, it is judged, before any 1939 specifications will be issued by the Brooklyn yard, although bids were asked by July 22 on two 15-hp. swing frame grinders, probably on the 1938 budget.

Retooling for New Models To Begin Aug. 1

DETROIT—Principal activity in the automotive industry at present is the final planning for 1939 production. Retooling for the new models will begin definitely in Chrysler and Ford plants on Aug. 1. General Motors divisions will begin similar programs about the same time. One of the most active of the machine tool programs is in the plant of Moraine Products Division of General Motors at Dayton, Ohio. This division is engaged in tooling at present for new line of bearings. It is said that Ford front end suspension systems will be manufactured by Briggs Mfg. Co. shortly.

wasters. June exports, amounting to 17,600 tons, were the lowest for several years.

Galvanized sheets are idle. June exports were 12,000 tons.

June pig iron exports from the United Kingdom amounted to 2900 tons, of which none went to the United States. Total iron and steel exports during June were 150,000 tons; imports amounted to 60,000 tons, of which 2700 tons came from the United States and 21,600 tons, all pig iron, from India.

Machine Tool Orders Gained in June

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION reports a "small but encouraging" upturn in both the domestic and foreign indexes of machine tool orders for June. The improvement, it is stated, is spotty as not all of the reporting companies participated.

The June index figure is 70.2 compared with 66.7 in May. The June index for domestic orders is 35.7 compared with 34.8 in May; and the June index for foreign orders is 34.5 compared with 31.9 in May. The June upturn was the first since March when the index figure was 107, but there was a drop in April to 90.3.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Constructing Quartermaster, United States Military Academy, West Point, N. Y., asks bids until Aug. 9 for one 1000-kw. turbo-generator unit with accessories. Plans are under way for new shop buildings for motor housing, fire house and other service, for which an appropriation of \$89,000 has been authorized.

Board of Education, Park Avenue and Fifty-ninth Street, New York, plans six new vocational and trade schools and has arranged total fund of \$16,253,500 in 1938-39 budget to provide for structures. A multi-story school will be erected to replace present Murray Hill High School of Building and Metal Trades, East Thirty-seventh Street, Manhattan, to cost \$3,618,500 with equipment; two large multi-story vocational schools will be constructed in different sections of Bronx, each to cost \$3,012,500, and an addition built to present Bronx high school for boys, cost \$985,000; a multi-story vocational school will be erected in South Flatbush, Brooklyn, at cost of \$2,687,500; and a new vocational high school at Corona, Queens, to cost \$2,937,500. Plans will be drawn soon.

Department of Sanitation, 125 Worth Street, New York, has filed plans for two-story motor truck service, repair and garage building on Tenth Avenue, 215th to 216th Streets, 200 x 200 ft. Cost about \$460,000 with equipment. Bureau of Architecture, Municipal Building, Fred B. McDuffee, director, is in charge.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 29 for 175 storage battery testing outfits and parts (Schedule 4020), 20 oil-burning lamps, 1400 oil-burning lanterns (Schedule 4021) for Brooklyn Navy Yard; until July 26, motor-generator sets, controllers, spare parts and accessories (Schedule 3955); two motor-driven warping capstans, with motors, controllers, electric brakes and spare parts (Schedule 3935), refrigerating equipment and spare parts (Schedule 3957); until Aug. 2, 32 steel valves (Schedule 4035), 48 radial roller bearings, and 24 thrust ball bearings (Schedule 4033) for Brooklyn and Philadelphia yards.

Representative Trading Corp., 225 West Thirty-fourth Street, New York, has acquired about three acres in Big Pine Key area, Key West, Fla., for new plant for production of commercial fertilizers. Work also will include large dock on waterfront for loading, shipping, etc. Cost close to \$50,000 with equipment.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Aug. 1 for alloy steel forgings (Circular 127).

Board of Education, Camden, N. J., plans manual training department in new multi-story elementary and junior high school. Cost about \$640,000. Financing in part has been arranged through Federal aid. Bids will be asked soon on general contract. B. H. Edwards, 130 North Broadway, is architect.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until July 26 for one TNT melting unit, continuous, double outlet type (Circular 14); until July 27, one rectification alcohol equipment, and one to three ether-manufacturing equipments (Circular 1120); until Aug. 1, two steam-generating units and auxiliary equipment (Circular 1141), quantity of gages (Circular 1085).

Bureau of Yards and Docks, Navy Department, Washington, will prepare plans for one-story heavy materials storage and distributing building at Philadelphia Navy Yard. Cost \$450,000 with equipment. Also for new one-

story paint and oil storehouse, cost \$100,000 with equipment, and one-story storage and distributing building at reserve basin, same yard, to cost \$225,000. Appropriations have been authorized in amounts noted.

Raker Paint Co., 850 Providence Road, Scranton, Pa., manufacturer of paints, varnishes, oils, etc., has plans for one-story plant unit. Cost about \$50,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until July 25 for heat-treated aluminum-alloy castings (Circular 1), one complete unit of heaters for building No. 47 (Circular 7); until July 26, 125 gages (Circular 1230), one motor-driven band seat scoring machine (Circular 8), 32,000 steel shell forgings, finished forged cavity, for 75 mm. shell (Circular 15), 22,710 steel forging (Circular 16).

◀ NEW ENGLAND ▶

Bay State Iron Foundry, 191 Old Colony Avenue, South Boston, gray iron castings, has acquired plant and business of J. E. Plympton & Co., Norwood, Mass., manufacturer of similar castings, and will consolidate both properties at latter location, where available buildings total 30,000 sq. ft. of floor space.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for two 750-hp. watertube boilers, mechanical stokers, steam turbine-driven forced and induced-draft fans, steel stack, air and flue gas ducts, and boiler auxiliaries with piping installation for power house at naval torpedo station, Newport, R. I. (Specifications 8828); also bids (no closing date stated) for turbo-alternators, condensers and auxiliaries for same power house and for power plants at navy yards at Charleston, S. C., and naval training station, Great Lakes, Ill. (Specifications 8829). Appropriation of \$300,000 has been authorized for expansion in power house at Newport station.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until July 26 for 300 gasoline torches, one pint capacity (Circular 12); until July 29, one index base, 12 x 24, with clamping and suitable swivel arrangements provided with four-bolt and two-key slots, machined to fit 24-in. hydromatic millers (Circular 2).

American Brass Co., Ansonia, Conn., has plans for one-story addition, 155 x 180 ft. Cost over \$85,000 with equipment.

Springfield, Mass., has plans for a trade school and other school units to cost \$1,050,000. Equipment will cost \$400,000. Frank W. S. King, 33 Lyman Street, Springfield, is architect.

Charlestown, Mass., Navy Yard has had plans approved for improvements in power plant to cost \$175,000, shipbuilding ways improvements to cost \$175,000; shipway cranes to cost \$150,000, shop cranes to cost \$65,000, machine tools and shop equipment to cost \$550,000, and other improvements.

◀ WASHINGTON DIST. ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for addition to overhaul shop at naval operating base, Norfolk, Va. (Specifications 8825). Appropriation of \$550,000 has been authorized to include equipment. Bids also are asked until Aug. 3 for storehouse building at Marine barracks, Quantico, Va., with electrical distributing, steam distributing, water and gas systems, and other utilities (Specifications 8867). Fund of \$250,000 has been author-

ized for storehouse with equipment. Bureau has secured following appropriations for extensions and improvements in navy yard, Charleston, S. C.: Addition to structural shop including equipment, \$325,000; extension to machine shop with equipment, \$275,000; new shipbuilding ways, \$450,000; general storage and distributing building, \$200,000; extensions and improvements in power plant, \$150,000 with equipment; and extensions in distributing systems for electrical service, water and other utilities, \$150,000.

General Purchasing Officer, Panama Canal, Washington, asks bids until July 29 for steel machine and carriage bolts, brass bolts, expansion bolts, steel nuts and rivets, brass nuts, steel lag screws, steel machine screws, lock washers, steel floor plates, iron or steel plate washers, railing fittings and other equipment (Schedule 3369).

United States Coast Guard Headquarters, Washington, asks bids until July 25 for one 400-lb., air-operated drop forge hammer, fitted with V-belt drive, 30-hp. electric motor (Circular CG-3473) for Curtis Bay, Md., station; three electric motor-driven industrial-type oil burners for same station (Circular CG-3485).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 26 for two precision lathes and attachments (Schedule 3964), one 20-in. hydraulic shaper (Schedule 3962), four precision engine lathes and attachments (Schedule 3968), one vertical spindle grinder, tools and equipment (Schedule 3970), two engine lathes, tools and equipment (Schedule 3972), one vertical milling machine (Schedule 3967), two milling machines, tools and equipment (Schedule 3969), all motor driven, for Alexandria, Va., yard.

◀ SOUTH ATLANTIC ▶

City Commission, Miami, Fla., asks bids until Aug. 3 for equipment for municipal electric power plant for power supply for waterworks pumping station, including two 750-kw. diesel engine-generator units with auxiliary equipment, switchboard, underground conduit lines and accessory equipment. Cost close to \$200,000. Carl F. Lambert, Biscayne Building, is consulting engineer.

City Council, Spartanburg, S. C., plans extensions at Memorial airport, including new steel hangar with shop and reconditioning facilities, administration building and other structures. Cost about \$370,000. Bond issue of \$82,000 has been approved and remainder of fund will be secured through Federal and County aid.

City Commission, Jacksonville, Fla., has secured Federal grant of \$1,127,000 for addition to municipal electric power plant, to cost \$2,500,000 with equipment, remainder of fund to be financed by city.

◀ SOUTH CENTRAL ▶

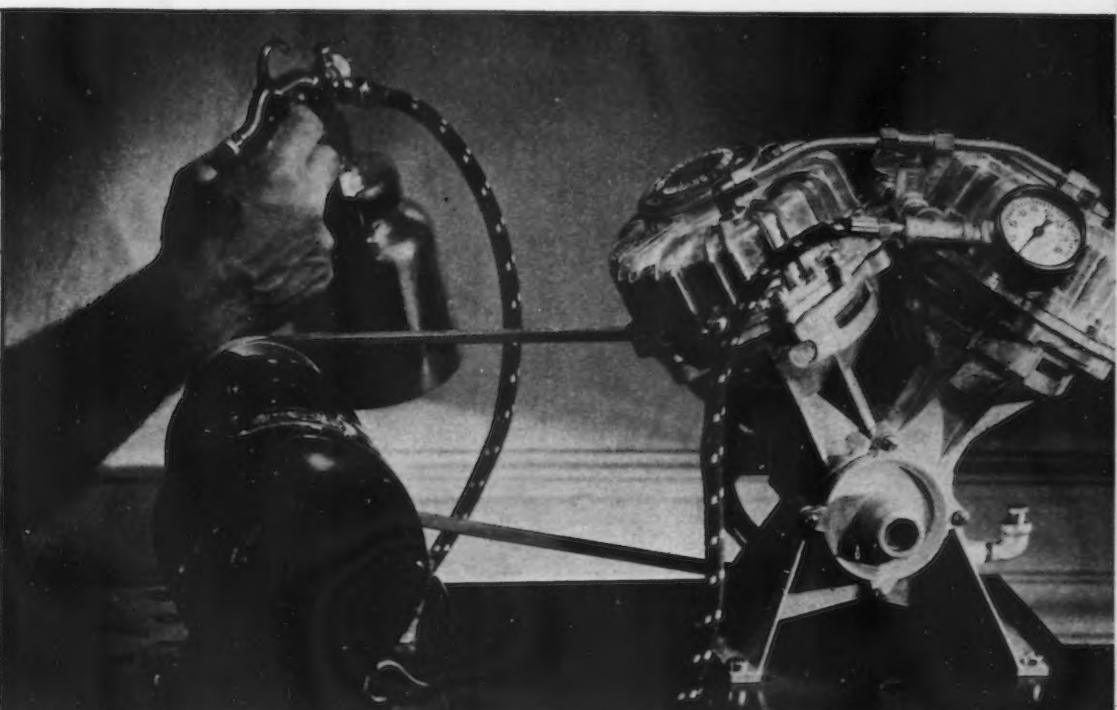
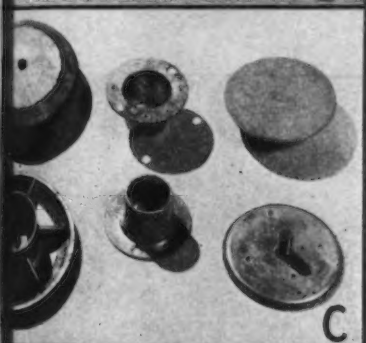
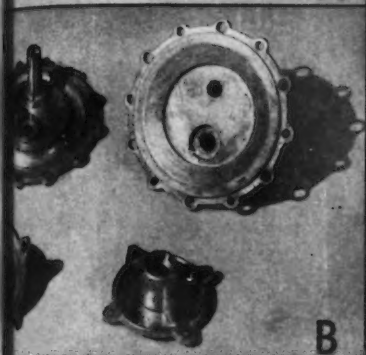
National Pressed Steel Roofing Co. of Tennessee, Inc., 46 West Virginia Avenue, Memphis, Tenn., Julian Fulenwider, president, plans one-story plant at Virginia and Kentucky Avenues. In addition to roofing products, plant will manufacture small steel specialties. Cost close to \$50,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until July 29 for steel guides and frames for spillway regulating conduit emergency gates for Hiwassee Dam. Plans are under way for new 44,000-volt transmission line from Milan, Tenn., to Bradford, Tenn., about 12 miles, to connect with system of Kentucky Utilities Co. at latter place.

United States Engineer Office, Memphis, Tenn., asks bids until July 26 for two 45-hp. diesel engine-driven crawler tractors, fitted with bulldozers, and for one 95-hp. diesel engine-driven crawler tractor (Circular 12-F); until Aug. 2, one two-drum hoist, gasoline engine-driven (Circular 11).

(CONTINUED ON PAGE 90)

Research was done, the Alloys were developed, and most Die Castings are specified with
HORSE HEAD SPECIAL (^{99.99+%} Uniform Quality) **ZINC**



DOUBLING UP ON ECONOMY

— With Die Castings

The terms "die casting" and "low-cost" are closely associated by every alert engineer. But pictured here is an instance where a manufacturer has "doubled up on economy" through the adoption of ZINC Alloy Die Castings for every possible part in a new diaphragm type paint sprayer.

Because the unit is a V-Twin job, practically all of the parts are in duplicate. Thus there were only 8 die cavities required to produce the 16 castings shown in photos A, B, and C. These, and the 6 individual castings in photo D, bring the total number of ZINC Alloy Die Castings to 22. The savings in machining and assembling—in metal and in weight—are obvious.

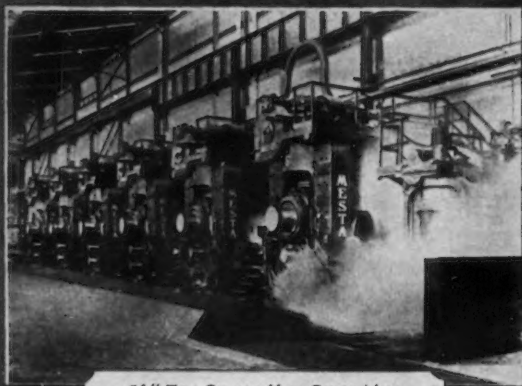
This does not mean, however, that you must have a "Twin" application to enjoy the advantages of the die casting process. There are countless thousands of single ZINC Alloy Die Castings doing outstanding jobs in many industries. If you are not thoroughly acquainted with the economies—and physical properties—of this metal and method, we suggest that you consult a commercial die caster—or write to this Company.



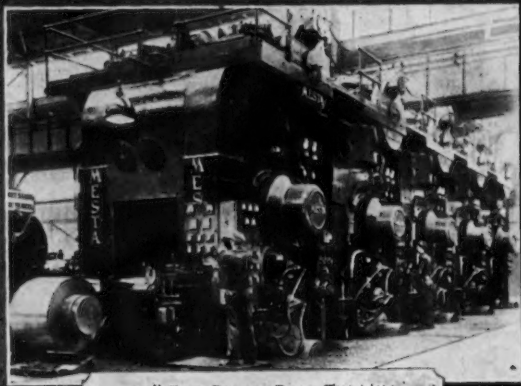
ZINC

ALLOY DIE CASTINGS

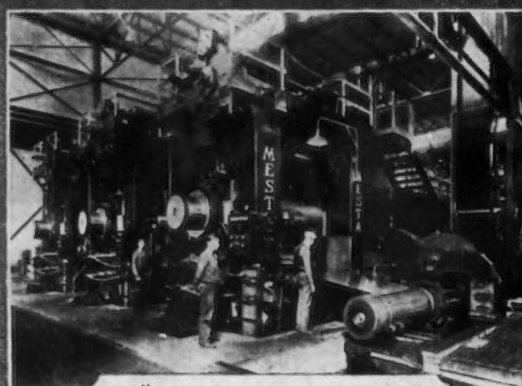
THE NEW JERSEY ZINC COMPANY 160 FRONT ST. NEW YORK CITY



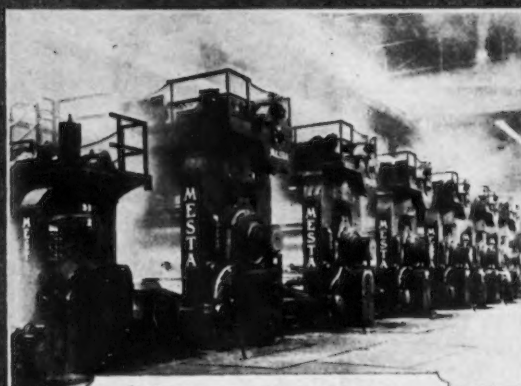
• 56" TEN-STAND HOT STRIP MILL •



• 42" FIVE-STAND COLD TIN MILL •



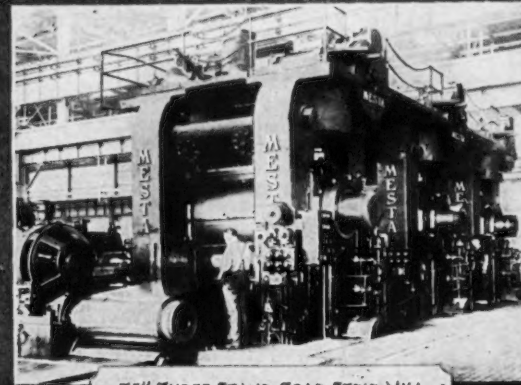
• 93" THREE-STAND COLD STRIP MILL •



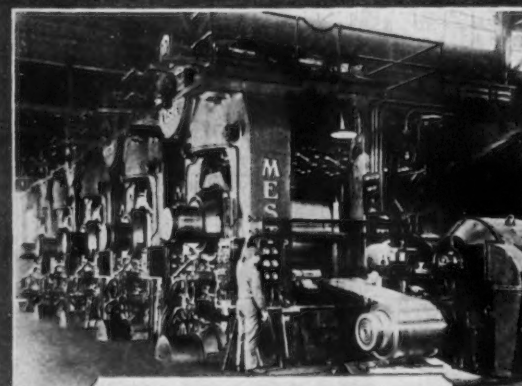
• 79" TEN-STAND HOT STRIP MILL •



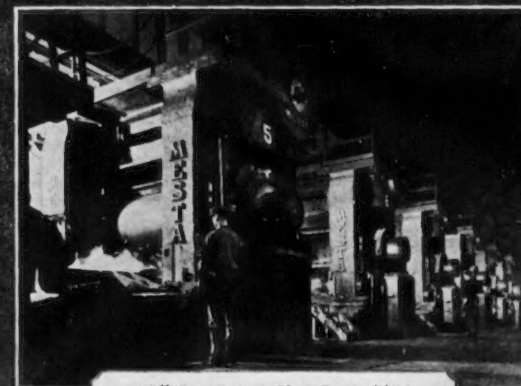
• 79" TEN-STAND HOT STRIP MILL •



• 75" THREE-STAND COLD STRIP MILL •



• 42" FIVE-STAND COLD TIN MILL •



• 96" TEN-STAND HOT STRIP MILL •

BUILT BY
• MESTA •
SINCE 1929

151 FOUR HIGH
COLD MILL STANDS

12 CONTINUOUS
FOUR HIGH HOT
STRIP MILLS . . .

120 STANDS

Mesta Machine Co.
PITTSBURGH, PA.

(CONTINUED FROM PAGE 86)

◀ SOUTHWEST ▶

American Refrigerator Transit Co., 210 North Thirteenth Street, St. Louis, has asked bids on general contract for new car repair shops at Main and Barton Streets, comprising two main one-story units, 90 x 429 ft., and 60 x 185 ft.; one-story welding shop, 25 x 55 ft.; one-story air compressor building, 26 x 26 ft.; one-story paint and oil storage and distributing building, 25 x 125 ft., and several smaller shops. Cost over \$150,000 with equipment. A. L. Becker, architect for Missouri-Pacific Railroad Co., Missouri-Pacific Building, is architect.

City Council, Larned, Kans., plans extensions and improvements in municipal electric power plant, including additional equipment. Cost about \$100,000. Financing is being arranged through Federal aid. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Cole Chemical Co., Inc., 3721-27 Laclede Avenue, St. Louis, industrial chemicals, etc., has plans for two-story and basement plant, 30 x 100 ft., with L-extension, 55 x 120 ft. Cost close to \$100,000 with equipment. Hugo L. Graf, 2825 Oliver Street, is architect.

City Council, Vandalia, Mo., plans new municipal electric power plant. Cost about \$165,000 with generator units and auxiliary equipment. Financing is being arranged through Federal aid. W. A. Fuller Co., 2916 Shenandoah Street, St. Louis, is consulting engineer.

Lufkin Independent School District, Lufkin, Tex., I. A. Coston, superintendent, plans installation of manual training shops in new high school on South Raguet Street, for which bids will be asked soon on general contract. Cost about \$200,000. Financing is being arranged through Federal aid. Shirley Simons, Citizens' Bank Building, Tyler, Tex., is architect.

Olympic Engineering Co. of Texas, 7402 Navigation Boulevard, Houston, Tex., manufacturer of mechanical specialties, liner hangers for packers, etc., plans new one-story plant. Cost over \$50,000 with equipment.

◀ OHIO AND INDIANA ▶

Barth Stamping & Machine Works, 3815 West Thirty-fourth Street, Cleveland, has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for one-story addition to machine shop, 45 x 50 ft. Cost close to \$40,000 with equipment.

Youngstown Furnace Co., Youngstown, Ohio, has let general contract to Felix Pesa & Son, Youngstown, for one-story addition, 55 x 170 ft., for storage and distribution. Cost about \$50,000 with equipment. Myron N. Goodwin, Union National Bank Building, is architect.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until July 25 for tube form vibration absorbers (Circular 8).

Board of Education, East Liverpool, Ohio, plans manual training departments in two new high schools, one unit to be located in downtown district and other, a junior high school, in suburban area. Cost \$500,000 and \$250,000, respectively. Bonds will be voted at primary election Aug. 9, remainder of fund to be secured through Federal aid.

Bureau of Prisons, Department of Justice, Washington, plans power house, pumping station, machine shop and other accessory buildings at new multi-unit Federal prison on State Highway 65, near Terre Haute, Ind., where 1200 acres have been secured. Fund of \$3,000,000 has been authorized for project.

Starr Co., Richmond, Ind., manufacturer of refrigerators and parts, has leased property at 12 South Twentieth Street, Birmingham, for new branch plant, primarily for assembling operations. Present branch at 2025 First Avenue North, Birmingham, will be removed to new location.

◀ WESTERN PA. DIST. ▶

Board of Public Education, Administration Building, 341 Bellefield Avenue, Pittsburgh, plans new multi-story vocational school at Sarah and Twenty-fifth Streets, at site of Morse elementary school, to be known as William M. Davidson vocational school. Cost \$1,128,200, of which \$805,500 has been secured through Federal aid.

United States Engineer Office, Huntington, W. Va., asks bids until July 27 for one gasoline engine-operated drill rig complete (Circular 8), until Aug. 8 for constructing eight steel needle flats (Circular 5).

County Board of Education, Berkley Springs, W. Va., plans manual training department in new two-story high school in southern part of city. Cost about \$180,000. Financing has been arranged through Federal aid.

◀ MICHIGAN DISTRICT ▶

Lufkin Rule Co., Saginaw, Mich., has plans for one-story addition. Cost close to \$40,000 with equipment. Fred Beckbissinger, Saginaw, is architect.

Huron River Silica Corp., 913 Dime Bank Building, Detroit, plans new silica sand mining, grinding and refining plant at properties at South Rockwood, Mich., including units for processing operations, with storage and distributing buildings. Company has arranged financing through sale of stock to total about \$560,000, majority of proceeds to be used for purpose noted.

Public Lighting Commission, Detroit, 174 East Atwater Street, plans extensions and improvements in municipal electric distributing system in city, including replacements in several lines. Cost \$1,361,000, of which \$561,697 will be secured through Federal aid.

Bureau of Prisons, Department of Justice, Washington, plans new steam power house at Federal prison at Milan, Mich. Appropriation of \$90,000 has been authorized for building, boiler units and auxiliary equipment.

Chrysler Corp., 341 Massachusetts Avenue, Detroit, has approved plans for one-story addition to branch plant at Windsor, Ont., operated in name of Chrysler Corp. of Canada, Ltd. Cost about \$125,000.

◀ MIDDLE WEST ▶

Peabody Coal Co., 231 South LaSalle Street, Chicago, plans new mechanical coal washing and cleaning plant at properties at Danville, Ill. Cost over \$500,000 with machinery.

Keystone Metal Cabinet Co., 3912-14 North Elston Avenue, Chicago, has let general contract to John Duff, 300 South Lombard Avenue, for one-story addition, 49 x 54 ft. Cost close to \$40,000 with equipment. Robert C. Swanson, 5137 North Troy Street, is architect.

Pure Oil Co., 35 East Wacker Drive, Chicago, has let general contract to Barnett & Record Co., Flour Exchange Building, Minneapolis, for new bulk oil storage and distributing plant at Superior, Wis., including boiler house and other structures. Initial steel tank capacity will be provided for 345,000 bbl. Cost about \$125,000 with equipment. Western Oil & Fuel Co., 227 Colfax Avenue, North, Minneapolis, an affiliated interest, will operate terminal.

First Iowa Hydro-Electric Co-operative, Inc., 210 Walnut Street, Muscatine, Iowa, plans hydroelectric power plant on Cedar River, Muscatine County, consisting of power dam, generating station, power substation and switching stations, and transmission lines. Entire project will cost \$3,500,000. Financing will be arranged through Federal loan and grant. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer. Harry J. Strong is manager.

Red Jacket Mfg. Co., 2527 Rockingham Road, Davenport, Iowa, manufacturer of pumping machinery and parts, has let general contract to Preister Construction Co., Davenport, for

one-story addition, in part for assembling operations. Cost close to \$40,000 with equipment.

City Council, Schuyler, Neb., plans extensions and improvements in municipal electric light and power plant, including additional 1000-kw. turbo-generator unit and auxiliary equipment. Cost about \$110,000. Financing is being arranged through Federal aid. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

◀ PACIFIC COAST ▶

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 2 for one motor-driven bench lathe (Schedule 3980) for San Pedro, Los Angeles, naval air station; two motor-driven wood bandsaws (Schedule 3960) for Mare Island Navy Yard; admiralty condenser tubes (Schedule 3963) for Mare Island and Puget Sound yards; two industrial-type gasoline engine-driven tractors (Schedule 3985), one variable speed electric hoist (Schedule 3988) for San Diego naval air station.

Seven-Up Bottling Co., 1348 Stevenson Street, San Francisco, has let general contract to W. C. Tait, 883 Market Street, for new one and two-story mechanical-bottling plant on Bayshore Highway, about 25,000 sq. ft. of floor space. Cost over \$65,000 with equipment. Albert R. Williams, 251 Post Street, is architect.

Superior Tank & Construction Co., 4735 East Fifty-second Street, Los Angeles, has plans for one-story addition, 115 x 150 ft. A crane runway will be installed. Cost over \$50,000 with equipment. W. M. Bostock, 6221 Pacific Boulevard, Huntington Park, Cal., is consulting engineer.

United States Engineer Office, Bonneville, Ore., asks bids until Aug. 10 for new steel tower high-tension transmission line from Bonneville hydroelectric power station to Vancouver, Wash., about 36 miles. Installation will require about 1,500,000 lb. of copper or aluminum cable, for which alternate bids are being asked.

Miller Malting Co., Hollywood Guarantee Building, Los Angeles, has let general contract to Jones-Hettelsater Construction Co., Mutual Building, Kansas City, Mo., for new multi-story malt plant and grain elevator unit in Florence district. Cost about \$175,000 with equipment. Edward Wilkes, Jr., Mutual Building noted, is architect and engineer.

Bureau of Yards and Docks, Navy Department, Washington, will have plans prepared for addition to equipment storage and distributing building at naval supply depot, San Diego, Cal. Cost \$350,000 with equipment; also for new fuel oil storage tanks and facilities at naval fuel depot, San Diego. Cost \$250,000. Appropriations have been authorized.

◀ FOREIGN ▶

Department of Government Railways, Sydney, New South Wales, Australia, asks bids until Sept. 14 for two watertube boilers and auxiliary equipment for Ultimo power station (Specifications 1011); until Sept. 28, one 20,000-kw. turbo-alternator with accessories for same station (Specifications 1012).

Cooperative Union of Sweden, Stockholm, Sweden, plans addition to porcelain works at Gostafsberg, Sweden, for new division for production of enameled iron sanitary ware. Equipment will be installed for all divisions of production. Cost over \$150,000.

Chromium Mining & Smelting Corp., Ltd., Montreal, Que., plans smelting plant at Sault Ste. Marie, Ont., for production of a new material for alloy steel industry. Cost about \$1,200,000 with equipment. Company has authorized financing to provide necessary fund. It is proposed to complete work in about four months. Leo H. Timmins is president.